BREAK-IN

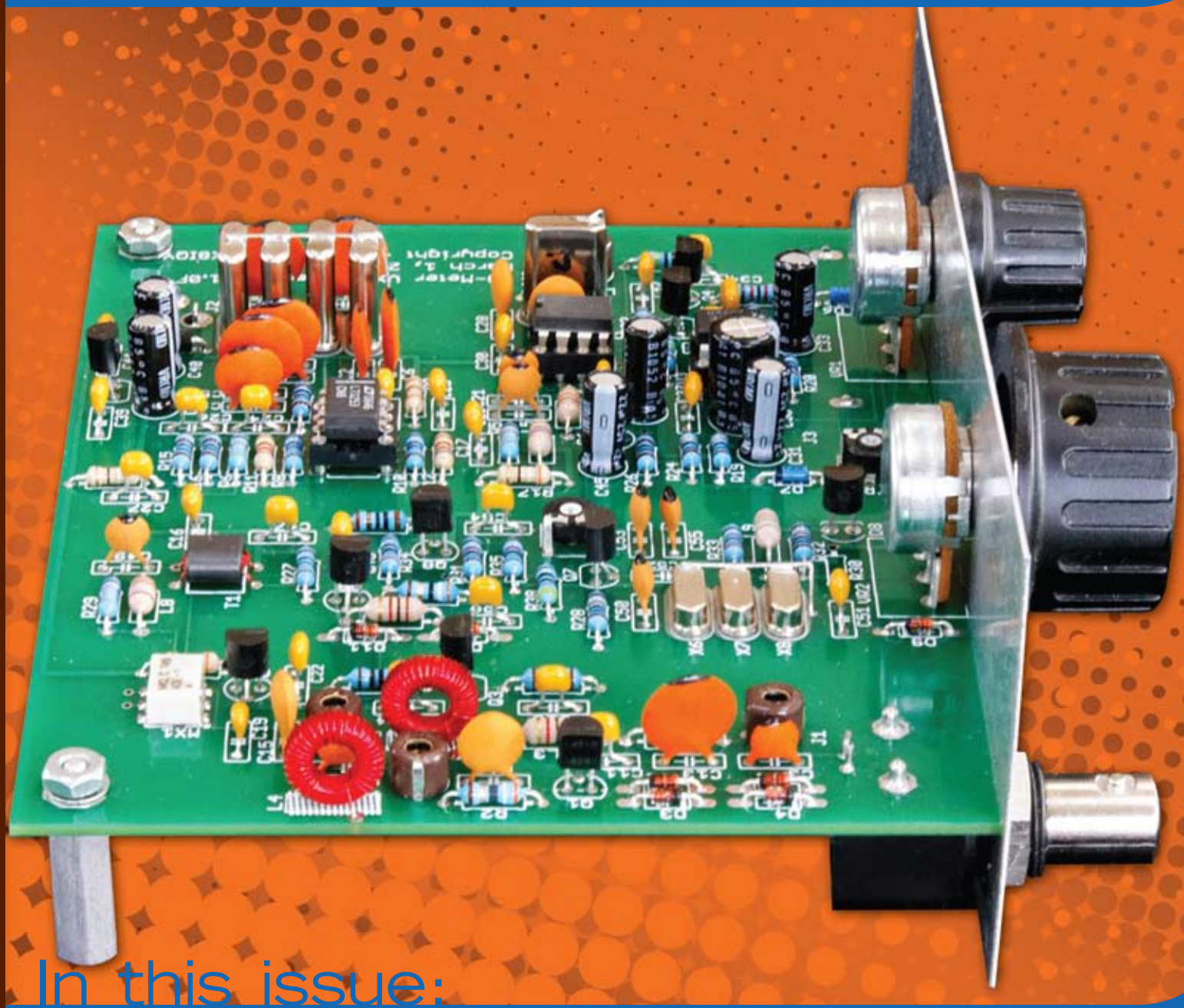
July/August 2011

The Official Journal of the
New Zealand Association of Radio Transmitters (Inc.)

Dedicated to

Amateur Radio and Electronics

in New Zealand since 1928



In this issue:

- Using 4nec2 antenna software; Pt 2
- Campbell Standard Mutual Inductometer
- Observations on the "Ground Gain" effect
- Review; Vector network analyser (VNWA) DG8SAQ
- The FLEX-5000A SDR
- Short off-centre fed dipole for 80 – 10m
- The plasma nuller
- Kordia agreement signed
- Memories of KW Electronics
- Minutes NZART AGM 2011
- Arthur Godfrey ZL1HV Branch Awards
- Amateur of the Year 2010; David Searle ZL3DWS
- Life membership Doug Ingham ZL2TAR

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BREAK-IN

Volume **84**
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July/August 2011

*The term **break-in** refers to a system in CW whereby the transmitting station can hear the other station's signal during "key up" periods.*

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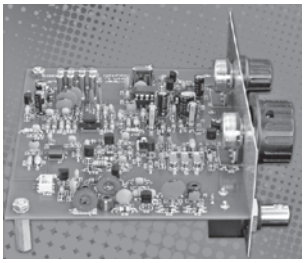

Cover Photograph; The interior of Jim Kortge K8IQY's SS-40 CW kit receiver (see Morseman column)

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PAST ISSUES OF *BREAK-IN*
Indexes for past volumes of *Break-In* from 1949 to the present are available on the NZART website: <http://www.nzart.org.nz/breakin/index/index.html>

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Position vacant

From The Editor

John Walker ZL3IB
<editor@nzart.org.nz>

Elsewhere in this issue of *Break-In* you will see a special advertisement from Kordia and an article by NZART Vice-President Vaughan Henderson ZL1TGC regarding the welcome news that Kordia has stepped into the breach and is now a 'premium sponsor' of NZART. More importantly this new development means that the future of our repeaters located on Kordia sites is now secure for the next five years. I am sure that all members will be relieved and most grateful to Vaughan for his sterling efforts on our behalf.

Sadly this issue also records the passing of Jamie Pye ZL2NN, one of NZART's great stalwarts who made many contributions to a wide range of amateur radio activities in New Zealand. As editor I will greatly miss his support through InfoLine and elsewhere.

The HAMADs section has always been popular with our readers and we welcome member's contributions. Furthermore this service is free to members. However the Advertising Manager and I would be most grateful if members submitting a HAMAD would follow the simple instructions on the top of the HAMAD form and post their copy to; HAMADS, PO Box 1733, Christchurch 8140 and NOT sent to NZART HQ. Doing this not only wastes Debby's time but you risk missing the deadline of 10th month prior to publication. Thanks.

73, *John Walker ZL3IB Editor*

Next deadline for copy is

10 September 2011

NZART Stolen Equipment Register

NZART Council has decided to discontinue the Stolen Equipment Register, effective immediately. All equipment which is stolen should be reported to your local Police Station.

New Zealand Association of Radio Transmitters

INC

(Founder Member of the International Amateur Radio Union Region 3)

Mail to: BUSINESS MANAGER, PO BOX 40-525, UPPER HUTT 5140, NEW ZEALAND

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ADDRESS		
OCCUPATION		DATE OF BIRTH

CALL-SIGN
PREFERRED BRANCH, NAME or NO
PLEASE FIND ENCLOSED $
MY SUBSCRIPTION TO Dec 31 2011
I agree to abide by the NZART Constitution
Signature:

The information requested (other than date of birth) is for membership records required to be maintained under the Incorporated Societies' Act 1908. Date of Birth is requested for statistical purposes only.

Membership benefits include the automatic inclusion of transmitting call-sign holders' address details in Call Book (published annually).

If you DO NOT wish your details published please sign below:

I DO NOT want my address details published by NZART _____

IF YOU PREFER TO PAY BY CREDIT CARD PLEASE COMPLETE

EXPIRY DATE

MASTER CARD ☐ VISA ☐

CARD No.

Signature:

From The President

Roy Symon ZL2KH
<zl2kh@xtra.co.nz>

Our 2011 Annual General Meeting and Conference has been and gone. Upper Hutt Branch did a magnificent job of organising the event which I am sure was enjoyed by everyone who attended. I was a little disappointed not to see more of you there but I do realise that travel and other costs have gone up, eating into your discretionary dollar.

The news from the AGM and Conference was broadcast live on Sunday night from the venue and has also been distributed by HQ Infoline. If you missed either of these, both are available from the NZART web page at <www.nzart.org.nz> so I won't repeat them here. The minutes of the Annual General Meeting are in this issue of *Break-In* and the minutes of the Council face-to-face meetings that took place on the Friday and Monday of Queen's Birthday weekend will appear on our web page once they have been confirmed by Council at its next on-air meeting.

The whole of the country has been appalled at the series of earthquakes that have devastated Christchurch. While there have been many teams that have responded to these terrible events, I would like to highlight the magnificent job done by our AREC people. The Christchurch Branch AREC Section, with a little assistance from AREC members from other Branches, was heavily involved from day one. There is an excellent account of their activity in the May/June issue of *Break-In* and if you have not yet had time to read this, I urge you to do so. Many of the amateurs involved had damage to their own properties yet rallied to the call and did a magnificent job. They may not have made the national news but played an essential part in the emergency. My heartfelt thanks to you all.

We have finally reached an agreement with Kordia regarding amateur radio repeaters on their sites. NZART Vice-President, Vaughan Henderson ZL1TGC, who was the NZART negotiator, is giving the details of this in a separate article. Again, my thanks to all concerned.

Midlands District Councillor, Ann Fraser ZL3TNT, has resigned from Council. I thank Ann for the work she has done during her term. This has created a casual vacancy on Council which will have to be filled. If you are a member from the Midlands District who would be prepared to be appointed to Council could you please contact me, any Councillor, or Debby at Headquarters, so that you can be placed on a list from which Council will make a choice.

As you will have learned from the Conference reports and InfoLine, we are planning a two pronged approach to membership this year. Council has decided that subscriptions will remain at the same level as last year, that is $95.00. To encourage you to renew promptly when you receive your 2012 subscription invoice with this issue of *Break-In,* all existing members will be eligible to go into a draw for a quality VHF hand-held radio provided you renew your subscription by 30 November this year. In addition to this initiative which I hope you will all respond positively to, we are planning a membership drive for later in the year to target non-members. Another hand-held radio will be offered as a prize and non members who join by 31 December will be eligible to go into the draw. If you know of an amateur in your area who is not a member of our Association, please bring this to their attention later in the year when we bring you more details of the new membership promotion.

Roy Symon, ZL2KH
President, NZART (Inc)

Kordia Agreement Signed

A new life for our repeaters

by Vaughan Henderson ZL1TGC, NZART Vice-President

On behalf of NZART Council I am very pleased to be able to report that a new lease agreement has been signed between your Association and Kordia Ltd. The agreement is for a five year term and covers all the existing Kordia sites which have amateur equipment installed.

NZART is pleased to recognise Kordia as a premium sponsor of amateur radio in New Zealand and their support will enable us to maintain and operate the various repeaters on their sites as well as allowing the National System to continue operation without expensive re-engineering. Kordia is a leading edge telecommunications supplier and we are delighted to have their sponsorship. Look for more information on Kordia on the inside front cover of this issue of *Break-In* and also have a look at the NZART website <www.nzart.org.nz> for a link to the Kordia website.

The annual value of the new sponsorship agreement with Kordia is $77 637 + GST; this is the figure we would have to pay if we were paying commercial rates for the eleven Kordia owned sites where amateur radio equipment is located. Other NZART branches that have their own websites are encouraged to also place appropriate acknowledgement of this generous sponsorship on their own websites. More information on this will be available in the near future.

The sites covered by the new Kordia Co-Location agreement are: Mt Cargill, Mt Egmont (Taranaki), Mt Erin, Wharite, Mt Grey, Blue Duck, Fitzherbert, Whakapunake, Kuriwao, Mt Murchison and Hedgehope. The three sites at Egmont, Blue Duck and Mt Cargill are all used for National System repeaters and links.

The agreement signals a return to the terms and conditions which existed prior to Kordia's decision to charge site rentals; ie there is no charge for the equipment rack space or antenna space and the only cost is a contribution towards the power used. This is less than $1000 per year and will continue to be paid for by your Association, as it has been since the original agreement was reached with Kordia's predecessors, BCNZ and BCL.

Particular thanks must go to Otago Branch for their excellent submission to the Minister for State Owned Enterprises, the Hon. Tony Ryall. This submission titled "Save Our System" and the Minister's subsequent actions clearly went some way toward assisting Kordia in reaching their generous decision to offer the sponsorship, resulting in an arrangement which is financially sustainable for the amateur community.

While the new agreement only covers existing sites, I would be happy to approach Kordia in the future to negotiate for additional sites for amateur repeater equipment. To this end ARTANZ have completed and submitted to Kordia the required engineering evaluation for Hedgehope with a view to the possible use of this site as an extension to the National System on to Invercargill and this site will be included in the new co-location schedule. Both Dunedin and Eastern Southland Branches have been actively investigating alternative sites for a National System extension which does not require the use of Hedgehope. I expect a final decision on the most appropriate site for an extension of the National System into the "deep south" will be made by the Branches concerned. βi

NZART CONFERENCE 2012 — BRANCH 26

In Nelson, Queen's Birthday weekend (1-4 June 2012)

Using 4nec2 Antenna Software; a tutorial. Part 2

by David Conn VE3KL

(Reprinted from The Canadian Amateur, *May/June 2010)*

Background

Part I of this series explored the basic use of 4nec2 antenna simulator by Arie Voors. This article builds on the previous discussion by introducing other useful features that are contained in the software. It assumed that you have read Part I, March/April 2010 TCA, *so a step by step description will not be given here. This portion is meant to be a hands-on tutorial that makes use of my website (see TCA Hotlink, 1) for screen shots and example files. This part introduces and demonstrates important features that were not covered previously. These features will be demonstrated through two examples: a two-element Yagi and an Inverted V with loading coils. These features include:*

- *Using symbols*
- *Using the optimiser*
- *Using loading coils*

Note: This article uses TCA HotLinks to provide access to enriched media from the RAC website. For more information, please go to <www.rac.ca/tca.May/June>

To make use of the optimiser, you will need to download 4nec2x from the 4nec2 website. This is a package that adds features to the basic 4nec2 program. You do not need to reload 4nec2.

The 3D-viewer form is available only for the extended freeware version 4nec2X, and requires a computer system on which the Microsoft DirectX 8.0 or later hardware–acceleration drivers are installed. If you have a modern computer system, DirectX is probably already loaded into the computer. If you do not have DirectX, it can be downloaded (free) from the Microsoft website.

Using symbols

In part I of this series, I described the geometry of simple antennas by typing the position of the wires directly into the editor boxes. This works fine for simple antennas but is quite limited for more complex antennas and cannot be used for situations where we want to use the Optimiser feature of 4nec2.

Instead of using a number to describe the input data, a symbol (variable) is used. This will first be demonstrated through the design of a two element Yagi (see link to 2 element Yagi on my website). The antenna is shown in Figure 1 and is described by the following symbols. Starting values for the symbols are also given. *(See table 1 below.)*

We will be using the same editor that was used in Part 1 of the series: the NEC Editor (New).

The symbols (table 1) are placed in the Symbols editor window once and can be used many times in other windows without the need for retyping them over and over. These symbols are easily changed in the design process. Symbols are also needed for the optimiser.

Once the symbols editor is complete, the other windows can now be edited with the use of symbols instead of number. For example, type freq into the Frequency box instead of the number 14. Also, populate the Geometry editor in the same way. For example, put driverlength/2 in the X2 box and so on.

Now save and run the program. First, calculate the far field. You will notice that the gain and front to back are fairly good but not optimum. Second, calculate the frequency response. You will notice that the antenna is tuned too high, 14.4 MHz. This will be corrected with the optimiser.

If you have trouble creating the file and getting results, I have posted a working file on my website with a screen shot for your use. See TCA Hotlink, 1 for the link to the proper page. The 4nec2 file is called YAGI2ELEMENT.nec. You can use that file to get a start with symbols.

Using the Optimiser

We will now tune (optimise) the antenna so that it resonates at 14 MHz, has a fairly large gain and good front to back ratio. This can be done by experiment with a trial and error approach but the process will take a long time, even for such a simple 2 element antenna.

An optimiser is a computer algorithm that attempts to meet an objective such as adjusting the length of an element to resonate the antenna at some frequency. We will use the built-in optimiser of 4nec2x to do this by adjusting the driver and reflector lengths to get the best SWR at 14 MHz. The most common optimisation process is the "hill climbing" technique. Here, the optimiser looks at the antenna performance and then makes a small change to the element lengths. If the SWR improves, more changes are made until a minimum is achieved. For a simple discussion on the "hill climbing" algorithm, see TCA, Hotlink, 3.

Note that this simple type of optimiser needs a fairly good starting point for the design of the antenna. Otherwise, it cannot find an answer. As a rule of thumb, I like to see the starting SWR less than 25 before the optimiser is used to fine tune the antenna.

Once you have a working file, the optimiser is used by opening it under the drop down list *"Start Optimiser"* of the calculate button. It can also be accessed from the function key [F12]. In this case, we will optimise the antenna to give the best possible SWR at 14 MHz by adjusting the driver and reflector element lengths. You must select these symbols for optimisation in the optimiser window. Note that there are other options such as optimising for gain, input resistance or combinations of several parameters. We will concentrate on optimising for best SWR. A screen shot of the optimiser window is shown on my website.

Now run the optimiser by:

- Pressing the [F12] function key while in the Main window or by selecting Start Optimiser in the Calculate window.
- Setting the SWR box to 100 and all other boxes to zero.
- Selecting the symbols driverlength and reflength from the symbols drop down list.
- Pressing Start button
- When the optimisation is complete, update the edit file and save as YAGI2ELEMENTopt.nec.

After you run the optimiser, note

Table 1

The frequency of operation in MHz	freq = 14
The length of the driven element [metres]	driverlength = 10.0
The length of the reflector [metres]	reflength = 11.0
The spacing between the driver and reflector [metres]	spacing = 3.6
The height of the antenna [metres]	height = 12
The wire diameter [mm]	wiredia = 10

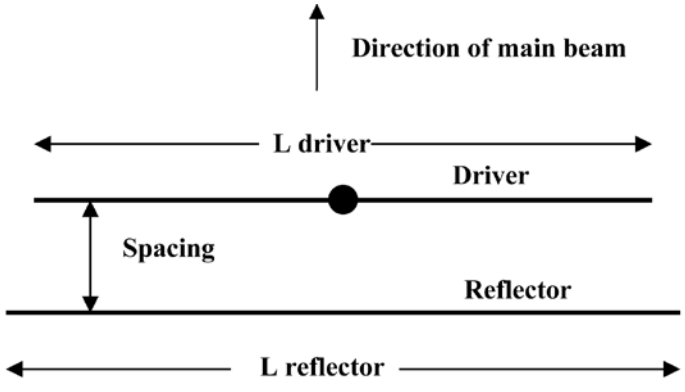
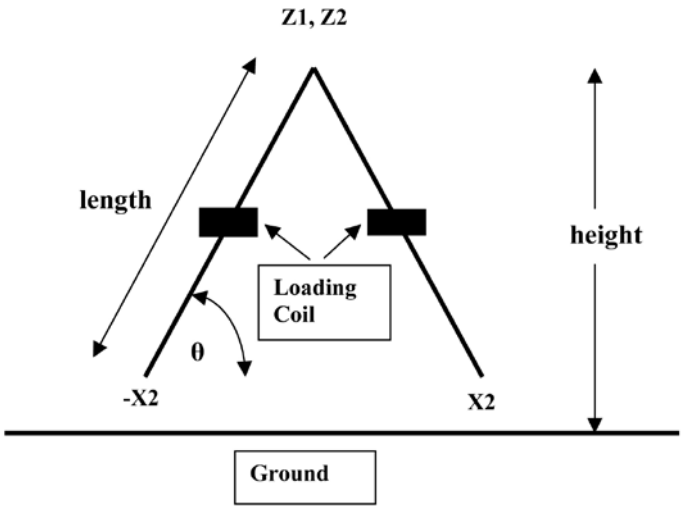


Figure 1. Diagram of the 14 MHz two element Yagi driven by a single voltage source centered on the driven element.



$$X1 = length*\cos(\theta) = -X2$$
$$Y1 = Y2 = 0$$
$$Z1 = Z2 = height - length*\sin(\theta$$

Figure 2. Diagram of the two band Inverted V antenna designed for portable operation on 7 and 14 MHz. The angle, θ, can easily be changed with the program editor.

that the antenna is now tuned for 14 MHz by running the frequency response (SWR vs. Frequency) calculator. Also run the far field calculator.

The gain of this antenna is approximately 11.4 dBi and its front to back ratio is approximately 11.3 dB. Also, the input impedance at 14 MHz is approximately 52 Ohms. No matching structure is required for this antenna. This is the design that I use for my own 20 metre beam. My Yaesu FT857 loads directly into this antenna with no reading on the SWR meter over the CW portion of the 20 metre band.

Using loading coils

To demonstrate the use of loading coils, we will study a simple inverted V antenna, Figure 2, that uses two loading coils connected to the center of each arm of the inverted V. The antenna was designed to resonate at 14 MHz with the loading coils shorted and to resonate at 7 MHz with the loading coils in place. This is a two band antenna that I use for portable applications.

This example really shows the power of symbols. This antenna is slightly more complex than the 2 element Yagi and requires some calculations using trigonometry which are readily handled in the Symbols editor. These equations are shown in Figure 2. Once the system is set up, we can quickly change bands and loading coil data with only two symbols being changed.

The loading coils are placed at the center of the antenna wires. That is, if the wire contains 31 segments, the loading coil will placed at segment 16. You might ask: why the loading coils were placed at the center of the wires? I have done this for convenience in the portable application for ease of band switching.

The only new item used in this example is the use of loading coils. See the editor windows on the screen shots for this example. I have selected a series RLC load from the drop down menu and set R to zero, C to a very large value of 1 Farad to simulate a series inductor and L = 19.96 μH.

I suggest that you run the program (see link to inverted V on my website) with theta set to 45° and then change theta to 60°. The file name that you download is INVERTEDVopt7.nec. Compute the frequency response in both cases to see the impact of theta on the impedance at resonance. You can also change the frequency to 14 MHz, set the trap inductance to zero and run the program again. Notice that the antenna is now tuned to 14 MHz.

Conclusions and further study

This series of articles presented two tutorials on the use of 4nec2 antenna simulator by Arie Voors. Once you have used some of the features in the program, it is quite easy to expand your horizons to include more modelling features that come with the program such as distributed loads and adding line loss to your models. You can also design patch, helix and parabolic antennas with this software. Once you start designing very large antennas, it will be necessary to use tools like VB.net to create complex wire structures because there will be too many parameters to type into the editors by hand.

Further study using TCA Hotlinks

Further information is provided with TCA hotlinks which are easily accessed via the RAC website. For this information, please visit <http://www.rac.ca/tca>. Hotlinks make it unnecessary to type URL addresses into your computer and provide you with calculators and other support that demonstrates the ideas presented in the articles. The following hotlinks for this article are available on the RAC site.

- TCA Hotlink, 1
  VE3KL website <http://ve3kl.com/>
- TCA Hotlink, 2
  4nec2 website <http://home.ict.nl/~arivoors/>
- TCA Hotlink, 3
  Optimisation <http://en.wikipedia.org/wiki/Hill_climbing>

Acknowledgement

The author wishes to thank Arie Voors for providing this very powerful antenna simulator to the amateur radio community and for reviewing part 1 of this series. βi

Until later, VY 73,

David, VE3KL

NZART RadioScience Trust sponsors KiwiSat research

The Trustees of NZART RadioScience Education Trust have recently received a grant application from Massey University, Albany Campus. The application was from the School of Engineering and Advanced Technology, Mechatronics and Robotics Cluster Leader Dr Johan Potgieter.

The grant requested is to assist four, fourth year degree students at the School of Engineering and Advanced Technologies School for a period of one year each, plus a one year study grant for a Master's Degree Student.

AMSAT –ZL and the KiwiSAT team have been working with Massey University now for some years, developing an Attitude and Control experiment, using inexpensive sensors being built here in New Zealand. The calibration and integration of the Magnetometer, as well as software development are all to be incorporated in the AMSAT-ZL KiwiSAT.

The Trustees are pleased to announce that the application for $7500 has been successful and a ceremony will take place at the Albany Campus of Massey University when one of the Trustees will present the cheque. A more detailed article will follow after the presentation has taken place.

This application is the first such application the Trust has received that is related directly to 'RadioScience and Education'.

NZART RadioScience Education Trust Inc

The Campbell Standard Mutual Inductometer; a rare find

by Reg Motion ZL2LX

There I was on holiday in Blenheim and idly looking through an antique shop when my wife drew my attention to a beautifully made, though slightly battered, box tucked away in a corner of the shop. Removal of the lid of the box disclosed a very old but well preserved piece of test equipment labelled as a Campbell Standard Mutual Inductometer.

My mind went back to a book I had read many years ago and referred to many times since; Scroggie's *"Radio Laboratory Handbook"*. MG Scroggie B.Sc., AMIEE was a consulting radio engineer in the UK from the 1930s until a few years ago. He published a number of books and articles over the years and his lucid style of writing appealed to me; I became a fan of his. His *"Radio Laboratory Handbook"* stretched out to nine editions over the years until 1971 and in two or three of the early editions he described his own laboratory in which he had a permanent setup of bridge type measuring equipment including a Campbell Inductometer which he praised for it's accuracy in measuring any inductance over the range from 1 microhenry to many Henries. He also mentioned that it was quite expensive, thus putting it outside the means of many radio amateurs.

Although I have had a wide acquaintance with the radio laboratory equipment employed by Government and industry within New Zealand I had never seen an inductometer of this type and after some negotiation with the owner of the antique shop I left carrying the device.

Figure 1 is a photo of the front panel, 260mm wide and 360mm long, and made of an insulating material, about 12mm thick engraved with a diagram of the interconnections. All components are mounted on this panel which is screwed into a high quality wooden box 160 mm deep. There are three variable controls having dials of white plastic engraved with scales, the small round one to read out small changes in the resistance setting and the larger square one to read out changes in the mutual inductance as well as one to assist in zero setting the mutual inductance scale.

Figure 2 shows the rear of the panel from the top end. A tightly coupled transformer is within the two vertical pieces of insulation which separate the panel and a subpanel at the top end as shown. Between these two separators is the primary and secondary windings of the transformer wound as pies about 100mm in diameter and very closely coupled with half of the secondary winding wound in reverse to the other half.

A third separator is at the bottom end of the subpanel which carries the rear bearings of the variable controls.

Above the topmost separator are some of the adjustments set by the manufacturer during calibration. On the main panel are range switches etc. Figure 3 is a photo of the rear of the front panel taken from the bottom end.

A small coil is shown pivoted on an arm so that it enters the field of the transfomer and being connected in series with the transformer secondary it modifies the field in the transformer. This coil is rotated through about 200° by the mutual inductance control on the front panel which is calibrated in terms of the mutual inductance change it produces.

In use the inductometer forms part of the lower arms of a bridge. Figure 4 is a simplified schematic of the whole bridge in which the inductometer comprises the four coils and the variable resistor (S) at the bottom. The two coils with the variable resistor between them form the primary of a transformer while the other two coils form the secondary. The two primary coils are connected in series-aiding while the secondary two coils are connected in series-opposing; thus the mutual inductance of the transformer is zero. A further small coil, not shown on the simplified schematic, is connected in series with the secondary and made mechanically adjustable to add to, or oppose, the flux of the inductometer transformer. This coil's mechanical adjustment is calibrated by the manufacturer in terms of the change in mutual inductance which it causes. In my instrument the change is from –5 through zero to +105 μH.

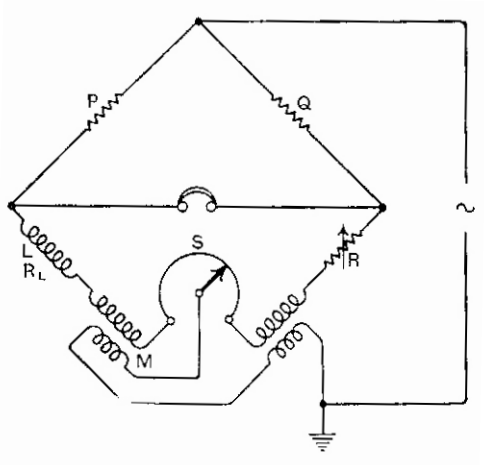
P and Q are the ratio arms of the whole bridge. L and RL is the component under test and R is an external resistance box inserted to extend the range of resistance measurement to cope with resistances of the component under test higher than about 0.5 ohms. The total bridge is powered with an external signal generator within the range 50 to 5000 Hz. The bridge nulls when the mutual inductance between the

Inductometer front panel.

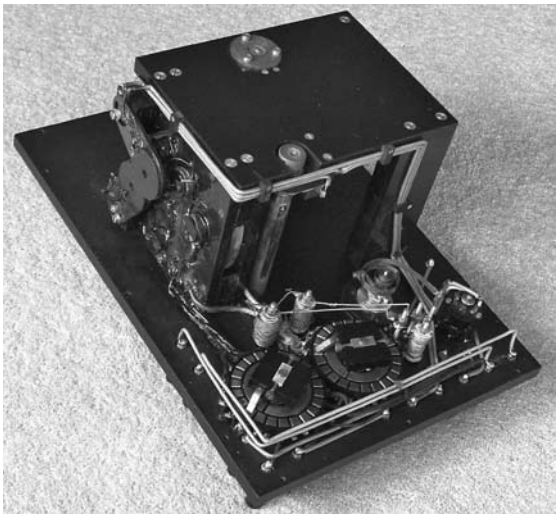
inductometer primary and secondary connections is reduced to zero at which point the voltages across the whole primary and the whole secondary are reduced to zero and the inductometer becomes effectively a short circuit as far as the rest of the bridge is concerned. Null detection is carried out with either a headset or an external amplifier-detector.

In use the bridge is first balanced with the component under test shorted out then, when the short is removed, a rebalance is made. The resistance and mutual inductance changes give the resistance and self-inductance (twice the change in mutual inductance) of the component under test.

The instrument I have was manufactured by the Cambridge Instrument Company in England and in spite of its age is still accu-



Inductometer circuit.



Inductometer; rear view, bottom end.

Some further observations on the "Ground Gain" effect

by Ian Cresswell ZL2BX

An article in the November/December 2010 Break-In *(The "Ground Gain" effect on VHF propagation) highlighted the effect on the antenna radiation pattern as the height of the antenna is varied. Increasing the height above ground produces an increase in the number of lobes. It is interesting to note that this effect led to significant advances in radio astronomy. In 1946 early pioneers in Australia used a 200MHz Yagi antenna 100m above the sea on a cliff top to produce an "interferometer" which had vertical lobes spaced about one quarter of a degree apart. By observing the sun as it rose through the antenna lobes they were able for the first time to determine the approximate size of a major sunspot group on the sun's surface.*

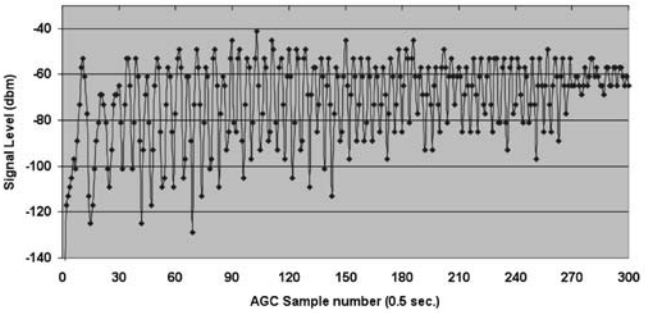


Figure 1. Typical AO-51 interference pattern. Elevation 0 to 7°.

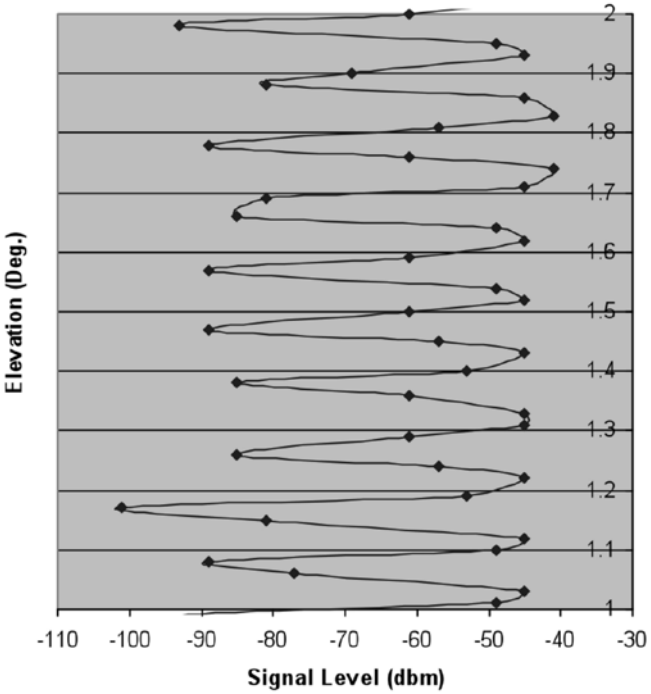


Figure 2. Fading pattern. Elevation between 1 and 2°.

The antenna lobes are produced by what is known as the Lloyd's mirror effect where a direct and a reflected ray from a source combine to produce an interference pattern. In phase signals add and out of phase signals cancel.

I notice this effect on satellite signals as the satellite rises above my southern sea horizon. My location is around 200 m above Wellington harbour and so has some similarities to the radio astronomy situation noted above. As the satellite rises I receive the direct signal and also a reflected signal from the sea surface. Because of this height above the sea foreground my antenna appears to have a large number of lobes which results in a series of signal enhancements and fades. This effect continues for approximately the first ten degrees of satellite elevation and gradually dies out as the elevation increases. Figure 1 shows a typical interference pattern for AO-51 characterised by signal enhancements and strong deep nulls and with the effect gradually decreasing with increasing elevation. Figure 2 shows the AO-51 signal level between one and two degrees elevation. The interesting thing about this graph is that it shows a pattern of nulls at almost exactly 0.1° intervals. The satellite situation is of course not as simple as the EME effect noted in the original article. In EME communications the range is effectively fixed. With the satellite, the range is decreasing as the elevation increases. Both of these conditions can produce a lobe pattern in the received signal. I had assumed that what I was observing was caused by the increasing elevation but began to wonder how much the change in range contributed to the overall effect.

In figure 2 the one degree range was 3072km and the two degree range was 2956km, a difference of 116km. At the same time the reflected path length varied from 3072.007km to 2956.014km, a difference of 115.993m. In fact the difference in the two path lengths as the elevation changed by one degree was 6.98 metres.

The AO-51 downlink is on 435.3MHz or 0.689 m. Therefore the change in range between one and two degrees elevation produced a shift of 10 wavelengths between the direct and reflected paths. Figure 2 shows exactly 10 cycles of peaks and troughs which indicates that the lobes produced by satellite signals at low elevations are almost exclusively caused by the change in range rather than by the change in elevation. βi

rately calibrated as far as I can judge from comparison of measurements on three air-cored coils with those taken with my Marconi Q meter at low radio frequency. The difference was less than one percent.

I am curious as to the origin of the instrument I have and would appreciate receiving any information on this point from readers. My email address is <regmotion@kinect.co.nz> and my telephone number is 07-5768 733. βi

References

Radio Laboratory Handbook, MG.Scroggie. Any early edition.

Alternating Current Bridge Methods. B Hague. 5th edition. 1946.

This article has also been offered to the New Zealand Vintage Radio Society for their publication if desired

New Members

Name	*City/Town*	*Branch*	*Call-sign*
J Houia	Lower Hutt	18	ZL2KEA
C Hodgetts	Auckland	29	ZL1CLH
B Winter	Lower Hutt	18	ZL2KT
C Beath	New Plymouth	27	ZL1PU
A Hoitinga	Pokeno	65	ZL1ATZ
B Lloyd	Invercargill	37	ZL3BL
P Royds	Tauranga	39	ZL1HD Reactivated 2006
R J Thompson	Auckland	29	ZL1HA Reactivated 1999
S Gosling	Dunedin	30	ZL4SLG
A Paull	Dunedin	30	ZL4XDJ

Longer Wavelengths

Con Wassilieff ZL2AFP
<zl2afp@nzart.org.nz>

SAQ transmissions

On 3 July 2011 the VLF station SAQ at Grimeton, Sweden, transmitted an 8 minute Morse code message at 0900 and again at 1200 hours UTC commemorating 100 years of Swedish coast radio. The frequency was 17.2 kHz generated by the historic Alexanderson Alternator.

Reports indicate that the signal was received locally in and around Europe (and in Alaska) but not in Argentina (or New Zealand!) Although the Russian Alpha navigational stations at 11.9, 12.6 and 14.8 kHz were received strongly at my QTH, the 200kW signal from SAQ sadly was not.

137kHz activity

Dimitris VK1SV reports visual reception on 26 May 2011 of JA7NI sending what appears to be 60 second dots FSK slow morse (QRSS60) on 137.779 kHz with 1 watt EIRP. This is at a distance of 8000 km so represents somewhat of a record for the 2200m band.

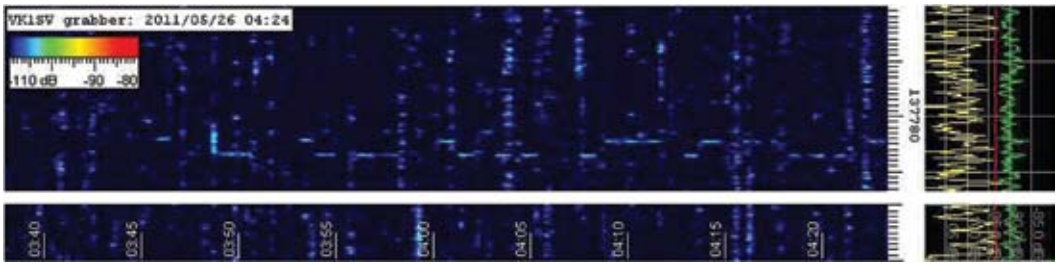


Figure 1. JA7NI capture by VK1SV.

ZLW centenary (1911-2011)

The Wellington Amateur Radio Club (WARC) is organising a special event to mark a hundred years since the ZLW coast station established in Wellington. Bob ZL2CA will have the honour of being the first to use a special commemorative call-sign ZL100ZLW to transmit a CW beacon message on the actual 100 year anniversary date of 26 July, on a frequency of 505.1 kHz. This frequency is the closest to the historic 500 kHz marine safety channel available within the terms of the temporary allocation for amateur operation of 505 – 515 kHz.

The first transmissions are planned for 7–10 pm on Tuesday 26 July, with further use of the ZL100ZLW call-sign on the regular Thursday evening MF interest group tests on 508.1 kHz. It is proposed that reception reports of a ZL100ZLW transmission can apply to WARC for a special QSL card.

600m net

The Thursday evening 600m net continues to meet weekly on 3666 kHz at 8.30pm. Contributors to the net have recently included ZL1QM, ZL1BPU (operating as ZL1EE), ZL2CA (operating as ZL2T), ZL2AFP (operating as ZL2EE), ZL3JE (operating as ZL3EE) and ZL4MD.

Graham ZL1QM now has serious power (about 200W) into his antenna and is regularly good copy up and down ZL. Murray ZL1BPU is designing a new DDS exciter capable of operating in the 600m band.

A simple synthesizer for 600m

Although I hope to benefit from Murray's good work in the exciter department in the meantime I have been trying a different approach to generating signals in the 600m band, with a synthesiser that uses the computer soundcard audio output as a reference. The soundcard audio is itself synthesised from a reference crystal oscillator and so is stable enough to be used to generate slow morse code (QRSS) with minimal drift. Keying the audio on-off at prescribed intervals, or shifting the frequency in prescribed increments, produces the requisite modulation. The audio is at 15.878 kHz, which is then "divided up" by 32 to 508.1 kHz. A frequency shift of 0.1 Hz at the audio level produces a frequency shift of 3.2 Hz at the RF level.

The circuit in figure 2 works well driving a single IRF510 MOSFET power amplifier via a TC4426 MOSFET driver, with output into a dummy load, but attempts to put useful power into an antenna so far have not been successful beyond a fraction of a watt, with RF getting into the synthesizer and putting the kybosh on the works. The division ratio needed is a factor of two different from what is required by simple mathematics and the PLL loop filter components are a compromise between reducing keying chirp and a clean signal so clearly a lot more design thought and work is needed, but as a proof of concept it is successful.

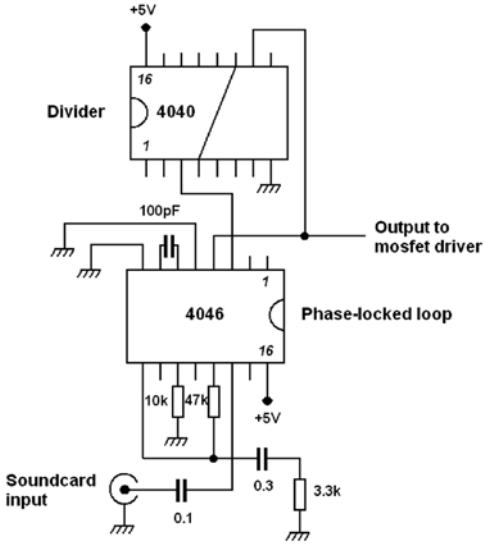


Figure 2. 600m synthesiser using.

SWR compensation of an oil jacket heater for a dummy load

Bob ZL2CA has been looking at simple dummy loads for handling high power on LF/MF reports his findings.

"Oil jacket heaters with 1 kW rating are candidates for dummy loads at LF and MF. The main limitation is internal inductance, which gives a steadily rising SWR with increasing frequency. 50 Ohms corresponds to a 230 V power rating of 1058 W, so candidate heaters are 1000 W or 1200 W for providing low frequency resistance around 50 Ohms. The challenge is to design a suitable compensation network so the heater presents a resistive load with low SWR at frequencies of interest. The idea tried was to integrate a low pass filter

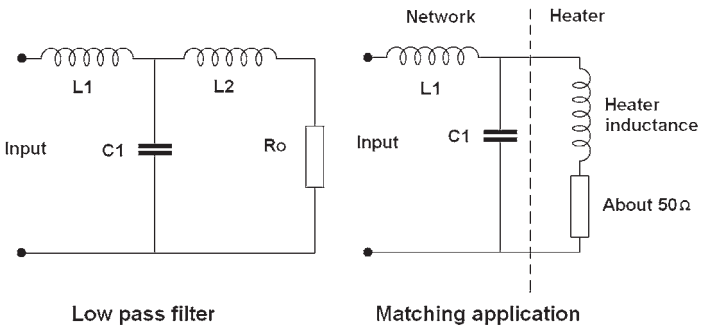


Figure 3. Matching of dummy load.

Frequency	SWR heater direct	SWR with low pass Tee
136 kHz	1.15	1.10
180 kHz	1.20	1.11
510 kHz	1.49	1.07

SPAM – Society For The Preservation Of Amplitude Modulation

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3.850 MHz (AM) Friday nights at 2000 hr local time.

Next deadline for copy is **10 September**

The 18th Annual General Meeting was held in Upper Hutt during the NZART Conference, at 1000 hours on Sunday, 5 June 2011. Jim Meachen (ZL2BHF) chaired the meeting. Twelve members and others attended with apologies being received from sixteen members. All the current officers were re-elected by acclamation. They are:

Auditor:
Malcolm Potts ZL2MRE
Librarian:
John Nicholson ZL1AUB
Secretary / Treasurer:
Roy Symon ZL2KH
Contests:
Mike Digby-Smith ZL1MDS and Barrie Vivian ZL2LA
Break-In Compiler:
Roy Symon ZL2KH

It was decided that the subscription remain at $5.00, payable once only on joining.

It was decided that the next AGM will be held at Nelson where the 2012 NZART Conference will be held.

The annual report showed that we have 265 members, six having joined in the past 12 months. There was a financial surplus for the year of $199.29. Regular fortnightly news bulletins to those members who are on E-mail have been sent. By this means 175 members are contacted.

The SPAM library continues to be handled by John ZL1AUB. Thanks go to John for doing a fine job. He states that there is not much to report on the SPAM Library front. Almost all the info that has been requested, and that he has been able to track down and supply, has been delivered by email which means no costs involved outside of those one normally has. The library continues to be financially self-sufficient.

New members

Three new members joined at the NZART conference. They are:

- 311, ZL2BCA, Dave Scott, Nelson
- 312, ZL2PO, Paul Moffat, Nelson
- 313, ZL4TAC, David Parish, Wellington

Silent Keys

Sadly, there is one member who has become a Silent Key. He is:

- 190, ZL2BSW, Ted Gedye, Wellington

Sympathy is extended to his family and friends.

Roy Symon, ZL2KH
Secretary / Treasurer
SPAM (NZ)

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with a moderately inductive load, such that the inductive component of the heater can be considered as an arm of the low pass filter. Refer to the diagram for a Tee low pass filter. Low pass theory is that L1, L2 and C1 can be selected for a given resistive load and cut-off frequency. Here the application is matching rather than filtering, and there is a limit on heater inductance if the resulting cut-off frequency is to be higher than the frequency range of interest for a dummy load.

Tests were carried out with a 1000W oil-jacket heater that has two internal two elements, with switching to select 400 or 600W or both, and both need to be selected to get close to 50 Ohms. A DMM found resistance via the power cord was 54 Ohms. Impedance tests between phase and neutral pins of the power cord found the inductance to be nominally 6.3 µH. A low pass Tee for 50 Ohms and L1 = L2 = 6.3 µH should have C1 about 5.3 nF and a cut off of about 1200 kHz, which is favourable for use as a dummy load for 500 kHz and lower bands. Impedance tests found the resistance increases with frequency (probably skin effect) and is about 57 Ohms at 136 kHz and 58 at 500 kHz. Trial and error to find optimum values for L1 and C1 that give lowest overall SWR could be considered to be doing some L network transformation to get the input to look close to 50 Ohms resistive. Experiments found best overall matching with L1 = 6.8 µH and C1 = 4.0 nF. The table gives SWR figures for bands of interest, for the bare heater and then with low pass Tee compensation.

The heater tested turned out to give a very good result once L1 and C1 were optimised. There is little difference in SWR whether the earth pin is jumpered to neutral, but for general safety it is best to jumper neutral and earth for the 3 pin plug, such as by clip leads, or make a dedicated interface box with coax to connect to the transmitter. The heater itself is unmodified and can be used for domestic heating when not needed as a dummy load. Note that testing to find the inductance of the heater needs the use of an RF bridge type of instrument, to obtain R + jX data at frequencies of interest. For example, an AADE inductance meter gave a reading of 16.9 µH when it is actually 6.3 µH. In selecting a heater to use as a dummy load, there is likely benefit in using a two element type, as parallel connection could give lower net reactance than a single winding heater element."

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Review: Vector network analyser (VNWA) DG8SAQ

by Peter Johnson ZL4LV

Measurement of RF impedances, that is the measurement of the resistive and reactive component (R ± -jX) has always been difficult with amateur equipment. Such devices as the noise bridge and various commercial instruments can do the task but most have their limitations beyond the HF or lower VHF region.

A novel approach by Tom DG8SAQ; originally described in *QEX* magazine (Jan/Feb 2009) describes a way of using the computer and its sound processing section to process the data and display it on the computer screen. With his approach he can achieve very good accuracy into the lower UHF region and it is usable with reduced accuracy to 1.3 GHz

His method is to use a direct digital synthesiser to generate any frequency in the range of 1 kHz to 1.3 GHz, a second identical synthesiser operating 1 kHz above the generator chip is used to heterodyne down the measured result to a frequency the sound card can handle; in other words a direct conversion receiver. This approach gives a major increase in dynamic range without the limitations that the traditional diode rectifier with its turn on threshold has. The generated frequencies can be a single or swept over a range. To achieve this upper range the synthesiser IC's are operated well above their specified frequencies, a warning about this is included in the set-up software.

The necessary information is measured in the form of S parameters (but these can be converted to the more familiar SWR, Return Loss, impedance etc within the program) is detected in a simple resistive SWR bridge and is fed to balanced mixers where the output is audio. The results are displayed on the screen on a rectangular plot with a superimposed simple Smith chart. The rectangular plot can have several selectable traces displayed on it, for example SWR and return loss.

The S parameters S11, S12 etc will not be familiar to most amateurs but are measurements of the complex impedance, that is resistance and reactance or resistance and phase angle of the input and output ports of the device under test. The associated program can convert these to the more familiar terms.

You can sweep the frequency over the entire range to 1.3 GHz or any wide or narrow segment within that range.

It is necessary to calibrate the instrument for the frequency and span you are to use. It consists of three parameters, an open circuit, a short circuit and a reference load. The accuracy of these references is important to achieve the full potential of the instrument, particularly in the VHF, UHF region. This calibration is saved for later use. It is also possible to calibrate the instrument so that the reference plane, which is where the actual point of measurement is at the end of a length of coax, the program can calculate the effect of the connecting coax and give the actual values there.

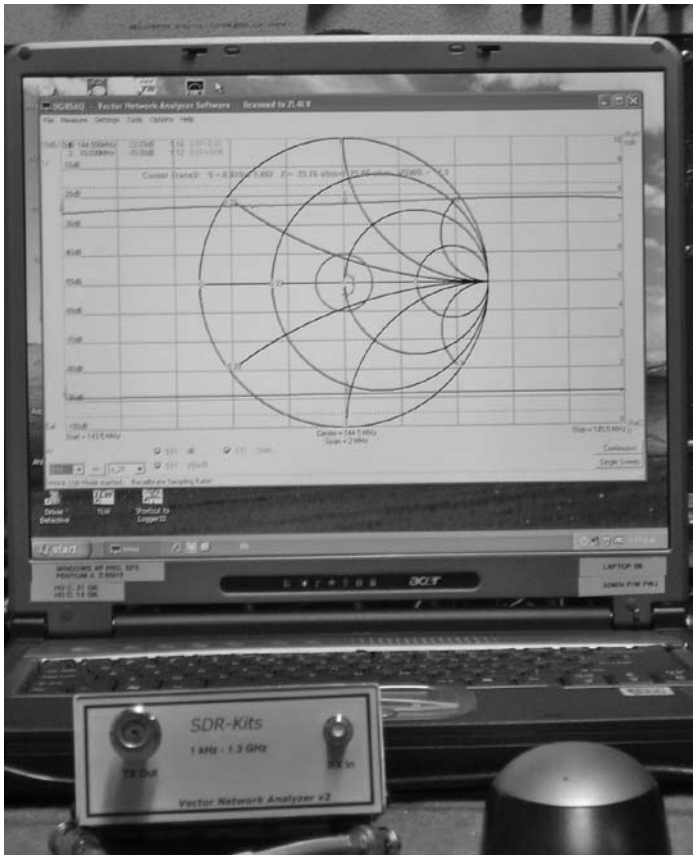
A moveable marker or markers can be positioned anywhere along the displayed trace, double clicking on this will display a list of the measurement at this point, SWR, Return loss, parallel or series impedances plus some more values.

The accuracy achievable is extremely high particularly in the HF region although this is dependant on the calibration references used. The nominal impedance tolerance of coaxial cable and connectors is a limiting factor.

As well as the output connector there is an input connector for the measurements requiring a through connection such as filters.

A built in, fully indexed, help file is included. There is also a printable help file of some 300 pages, it is less usable, there is no index, a number of blank pages, references to earlier version of the instrument, it looks more like work in progress rather than the final item.

At this stage I have made only limited use of the instrument's capability, matching two metre band Yagis for an EME array, checking the performance of associated matching



The SDR Kit's Vector network analyser.

sections. At the low frequency end I have checked the operation of my 80 metre and 40 metre aerial tuners.

The display can be programmed to display what you require.

It is a very small and lightweight instrument and can be positioned close to the measurement point and since it is powered from the USB port using a USB extension cable it can be used some distance from the computer. The SMA coaxial connectors appear rather delicate and vulnerable when attached via an adaptor to some RG213 cable. But the unit is so small and light it can be suspended from the cable.

It will be necessary to purchase some SMA to N and BNC inter-series adaptors to interface to existing systems.

The instrument was originally available as a kit but I suspect that some constructors had difficulty in its assembly with the surface mount components. It is now only available as a fully assembled and tested unit from SDR Kits in the UK. This assembled version has the sound IC built in. At the time of writing this review it has just been announced that the version 2.6 that I have has been discontinued and will be replaced with version 3.0. I have no details on what changes have been incorporated.

The software and documentation is freely downloaded from <http://sdr-kits.net/DG8SAQ/VNWA>, it is also available from <http://yahoo.com/group/VNWA/files/A1 DG8ASAQ/>. Note you need to be member of the VNWA yahoo group to access this folder. There is also an extensive forum on the Yahoo site where questions are raised and answers provided.

This is a sophisticated instrument capable of measuring and displaying to a high degree of accuracy many of the parameters relating to aerials and transmission lines, as well as filters. It would be wasted if all you wish to measure is SWR. It takes a good deal of technical knowledge and expertise to fully appreciate and use its potential.

Since this was written information on version 3 has been released, it can be downloaded from <http://sdr-kits.net/DG8SAQ/VNWA/VNWA3-productinfo.pdf>

Memories of KW Electronics

by Phil Holliday ZL3PAH

KW Electronics was the legendary manufacturer of amateur radio equipment in the UK, with a long line of successful products – the most famous being it's KW2000 series of SSB transceivers. As a teenager, and a newly licensed but impecunious ham, I had drooled over their product range.

KW2000D front.

Job application

In 1970 I was a young RF development engineer, one year out of university and with a passion for HF receiver design. I was working for a subsidiary of Racal in the UK designing test equipment for the UK army's 'Clansman' range of VHF radios when an advert appeared pinned up in the lab for "HF Development Engineer, £2000 pa." and an address in Dartford, Kent which I instantly recognised as the home of KW Electronics Ltd. In those days £2000 was a huge salary for this position and at least half the engineers in the lab applied.

I applied and received an invitation to an interview and for the first time met the managing director and owner Rowley Shears G8KW; –universally known as RGS. As I learned later he was a wonderful man but probably somewhat misguided in his interview technique as he seemed more interested in my passion for amateur radio and told me that as I had passed the morse test and had my ticket I would receive an additional 10 shillings on my salary as this was the standard in the company! (I was never sure if this was true).

He sent me over to see Fred Hill, the chief engineer for my technical interview. (Fred worked for me many years later when I was technical director and general manager of Burndept Electronics Ltd in Erith, Kent). Fred sat me down, looked at me and said something like "You look right, bit odd (I had very long hair; I was still coming out of the 60's) but that is good. You can always tell good engineers; they all look a bit odd." And with that I was sent back to the office where Rowley offered me as I recall £1650 pa. Less than I had expected, but at least I had my dream job. He then told me that my first project was to design the next in the line of KW2000 series, the solid state KW2000T (T for transistor).

First day

My first day at Dartford was a bit of an eye-opener. I had seen adverts which had run for years on the front page of *Short Wave Magazine* showing the KW development lab absolutely bursting with Rhode and Schwarz test equipment, but there was none to be seen. I was told that it was all borrowed for the advert and one of the directors was also on the board of the R&S agents. (We eventually did get some reasonable test equipment which RGS seemed quite happy to pay for; we bought a 500MHz scope and a state of the art (in those days) HP 141T spectrum analyser. At last we could see what we were doing).

I met with RGS to discuss the spec for the KW2000T, really he just wanted a solid state transceiver to take over from the KW2000B although when we talked about solid state in those days it was understood that this did not include the driver and PA. After he had gone through the basic requirements, 160m-10m, SSB & CW, 180W pep, I thought we needed some actual design targets such as sensitivity, intermodulation, etc and I remember he just said 'They must be good'.

The working environment

The lab at Dartford was upstairs in a long thin building (the offices and showroom were in another building close by with a bookies on the ground floor) which had the drawing office at one end and the lab at the other, split into several 'cabins' each housing an engineer and his apprentice. The cabins had a bench (for the apprentice) and a desk (for the engineer) and the partitions between them were flimsy and from halfway up they were glazed. There was a gap underneath them and I provided continuous amusement for everybody when they discovered that my nerves would not stand the strain of a 10µF 16V electrolytic on two long wires slid under the partition, under my desk and then connected to the mains. I moved to the bench eventually and gave my apprentice the desk!

The whole place was heated by a fearsome diesel fuelled stove of uncertain manufacture. At the start of winter when the stove was first lit there was a dreadful smell of burning rubber caused by the large quantity of rubber cable sleeves which had accumulated over the summer as one of the after work games was a catapult and rubber sleeve fight, normally instigated by the apprentices. It was their job at the end to go through the lab and collect all the sleeves and put them back in the drawers where they belonged, but they never got them from the stove.

KW2000T

I started work on the design and I do not have my notes from 40 years ago but as I recall I used a hot carrier diode ring mixer with minimal front end amplification, a 9 MHz IF using a KVG crystal filter, a crystal mixed phase-locked loop and a Vackar oscillator as the VFO and the Plessey SL600 series integrated circuits in the signal chain. I am not sure if I included a digital frequency readout at this time, but think I did. It all worked and we built the Tx quite quickly and RGS took it home to try it out. He came back with a report that the frequency was off by 3 kHz; I had got the maths wrong and so ordered a new set of crystals. But the KW2000T was about to be shelved, and in actual fact I am not sure that in the early 70s the amateur population was really ready for a solid state rig. Fault finding seemed much easier in those days; if something stopped working then lift up the lid, see which valve is not lit up and change it.

KW3000

However I had spent some time helping Charlie Baty, (a first class engineer who later worked with me ten years later when I was Chief Engineer at the International Marine Radio Company) with a design for a synthesised receiver and this got in the way of the KW2000T progressing. Charlie and I had discussed over some time an up-conversion design for a receiver and I had got hold of some 38 MHz roofing filters so we started working on this. RGS found out and decided that this was a project he could sell to his commercial clients and so the KW2000T sat on the shelf for a while. Charlie was well known for not going on holiday and had several months owing to him. His partner (who worked at the factory at Crayford) finally dragged him off to a French beach somewhere for a fortnight to get him away from work, but she didn't know that he had taken about ten lab books with him and two weeks later he returned with the books full and a paper design which we started to develop. When I left KW three years later Charlie was still working on it; it had become the KW3000 and I am not sure that

KW2000a.

continued on page 12

continued from page 11

KW108 monitorscope.

it ever got finished, a fairly normal story for that company.

Stores and Sales

Downstairs from the lab was the Finished Goods Stores and second-hand equipment store presided over by the van driver, whose name escapes me but who seemed to be able to get anything for anybody and who made a career out of driving between Dartford and Crayford many times each day. We were never encouraged to buy any of the second hand kit (disloyal) and I remember a very short-lived sales manager who brought in his immaculate Collins S-Line to sell second hand. It really was beautiful but out it went, followed shortly after by the aforementioned sales manager.

A few weeks later a new sales manager arrived. He was Bill Doe, G3XRY (sk) and we became great friends. He had been a session drummer and claimed to have taught John Hisemann to play the drums. He used to work in one of the music shops in Tin Pan Alley (Denmark St in London) and had wonderful stories to tell of famous people coming into the shop. His daughter had a boyfriend who had just returned from India and had brought back a sitar and wanted to sell it, and I was a George Harrison wannabee in those days. So I went home one evening to meet his family and buy the sitar. I was greeted by a very friendly monkey who was in a massive cage in their kitchen, the monkey would not stop rattling the bars and Bill told me that this was a new cage with a monkey-proof lock as he used to get out of the old cage in the middle of the night, help himself to something from the fridge and then get back into his cage. We had an excellent evening and the monkey was allowed out and spent half an hour sitting on my head and the rest of the time on top of the curtains. The next morning Bill told me the cage was going back, the lock wasn't monkey proof, he had got out and emptied the fridge all over the kitchen then got back into his cage.

Amateurs often used to arrive with a pocket full of cash to buy a rig, and a request for a receipt for about a quarter of the price of the equipment 'For the XYL you know'. You know who you are out there.

JY1 and the BBC

One day there was great excitement as a TV crew were coming down to the office to film us trying to contact King Hussein, JY1 as there had been some sort of disturbance in that part of the world. We had a showroom just outside the main office and the crew set up and RGS and I were filmed calling JY1 from GB2KW. No reply of course, there was no propagation at that time of day but the crew took the film back and left a reporter and me. RGS wisely went home to tea. We spent quite a long time tuning around and finally the reporter suggested that we go to the pub for a few minutes. We knew that ITV (the other channel) were with another ham and also looking for a QSO with the King. We had a quick pint and then went back, but of course we had missed him. ITV got the QSO and scoop.

WPX SSB

I think that the only two stations with a GB2 prefix were ourselves and the Science Museum (GB2SM) and I decided to have a go at the WPX contest from GB2KW. I must have spent about eight hours in total on 20m on Saturday and Sunday afternoon of the contest and had over a thousand QSOs. No computer logging in those days, no recorded CQ, but great conditions and good pileups.

Crayford factory

The factory at Crayford was a few minutes away. We had a telephone system which connected several phones at Dartford to several phones at Crayford, and the phones had a handle which rang the bell at the other end. You rang once for the factory manager, twice for purchasing, three times for the test department etc. Crayford had a relaxed atmosphere. All the girls on the production line used to sing as they worked, normally negro spirituals, and in harmony. Their work rate seemed to be geared to the rhythm and I have memories of the song *'Swing Low, Sweet Chariot'* very slowly and Roy Taylor the works manager trying to gee them along by singing *'De Camptown Ladies'* to no avail.

The Crayford test department had their own projects which seemed to overlap into work time (I remember one test engineer was building a 'Leslie' speaker, and there were several other things on the go). Whenever RGS left the office to go to the factory he would tell his secretary he was going to Crayford and as soon as he was out of the door she would ring the 'emergency' number, continuous winding of the handle, until everyone picked up the phone and she would tell them RGS was five minutes away. He was sure that the work rate was not what he wanted but could never put his finger on the problem. Then one day he left the office, said he was going to the dentist and drove straight round to the factory. I understand that things improved for a short while.

The KW2000T never made it into production, partly because we were busy with commercial equipment development. We made a vehicle mounted HF SSB set (GR415?) and a marine radio (GR377?) both for Redifon™, and these had priority in the drawing office. In those days there was no CAD for PCB layout, in fact there were no computers, the PC was still some years away. However after I left Peter Chadwick G3RZP took it over and produced the KW2000CAT; a four channel HF commercial SSB radio. KW had produced the KW2000CA which was a four channel commercial version of the KW2000A and which was used by among others BOAC. In fact Marconi produced a wonderful full page advert showing a photograph of all their equipment installed at I think Heathrow. There is also a KW2000CA in the photo and if you follow the cable from the mike in the hand of the operator it did not go to any Marconi radio, it went to ours! I believe that there was a KW2000C earlier on which would have been based on the original KW2000 and would have had a single 6146B in the output I guess but I do not recall ever seeing one.

KW2000D

I had scribbled down a design for a frequency counter for the KW2000B one afternoon and it seemed like a good idea so I spent a few days making two and had the drawing office produce a couple of new front panels; we called it the KW2000D. It all shoe-horned in quite well. The display resolution was 1 kHz and the display used a seven segment vacuum tube device called a 'Numitron' made by RCA and which produced a bright white display. I thought I had better show RGS, initially he was not too taken I think. But the Redifon people were coming round and he showed it to them, and they were very taken with the idea and asked if we could retro-fit a digital display to some of their radios. I don't think it ever eventuated in a contract but RGS was so pleased he took me downstairs to the stores and gave me a rotator; don't think I needed one at the time but you never look a gift horse in the mouth.

RGS had one of them and I understand that he eventually gave it to the RSGB museum. Many years after I left I got the other one, someone had

The FLEX-5000A: a Software Defined Radio

by Alan Cresswell ZL2BX

Around 1970 the word "digital" started appearing in advertisements for amateur radio transceivers. The big selling point was a radio with a digital display. In 1980 a new breed of transceivers started to appear in Break-In. *The IC-255A for example boasted that it was "Computer Controlled" and contained "ICOM's original programs". In April 1982 Kenwood introduced the TS-930S "with the latest space age microcomputer circuit control". Since then, as each new generation of transceivers has evolved, the microprocessor has increasingly become the heart of the modern transceiver.*

In parallel with this trend has been the evolution of PC based software that provided a range of additional functions to those found in the transceiver. The Computer Aided Tuning (CAT) interface became standard on most radios to link the transceiver and the PC. The PC opened up a new way of viewing signals with its visual display while the radio, essentially by means of the microprocessor, provided control and the increasingly important digital signal processing (DSP).

The next logical step in the chain was to combine the display and signal processing into a single package. This produced two divergent trends. The visual display feature was added to the radio or the DSP and control functions were added to the PC. The latter option produced the so called Software Defined Radio or SDR. One of the early versions of the SDR was the "Kachina" which appeared in the January/February 1999 issue of *Break-In* and claimed "performance levels unimaginable in the analogue world."

The advantage of adding the display feature to the radio is that everything is incorporated into one tidy package. The disadvantage is that size and processing constraints limit the size and functionality of the video display. The advantage of the SDR approach is that the display area is large and the PC provides significant processing power for the critical DSP functions. The disadvantage is that there are now two packages. The hardware, which is still required to provide front end (RF signal amplification and A to D conversion) and back end (D to A conversion and RF power amplifier) and of course the PC in between. There are many other points of difference between the two approaches but in the end, as with any radio, it becomes largely a matter of individual preference. The purpose of this article is to look at some of the features of one such software defined radio; the FLEX-5000A which is probably the current frontrunner in the SDR field.

The FLEX-5000A Hardware

The hardware is housed in a single cabinet (23 by 23 cm and 37cm deep) which contains a number of modules.

1. An optional ATU.
2. The RF Front end, A to D converter, filters etc
3. The back end D to A converter and audio amplifier.
4. A 100 watt Power Amplifier.
5. An optional second receiver.

Figure 1. The rear panel.

There is also room for additional units such as the optional VHF/UHF module.

The receiver covers 10 kHz to 65 MHz and the transmitter covers all bands from 1.8MHz to 50MHz.

The only front panel controls are the On/Off push button, a microphone input connector and a headphone output jack. Everything else appears on the PC display. All antenna and interface connections are on the rear panel as shown in Figure 1. There are three primary antenna ports that can be software selected and assigned as either receive, transmit or both, and a further two receive only connectors. There are additional connectors for adding transverters, and VHF/UHF inputs. There is also provision under software control to select external items such as preamps, filters etc. for inclusion in the receive path between the antenna input and the front end. There is the usual array of connectors to control linear amplifiers (one control line for each primary antenna input) and to interface with the PC (Firewire, Line In/Out) and external hardware (Flexwire Bus) etc. A 10 MHz BNC connector allows an external precision frequency source to replace the internal 10 MHz TXO.

The Software

The SDR is essentially software. There is a small amount of updateable firmware embedded in the system but the whole SDR philosophy revolves around software running on a PC. The FLEX-5000 software is known as PowerSDR. This is "open source" software which means that any software developer is free to add or upgrade features in PowerSDR. Open source does not mean open slather. Flex radio controls the development environment and periodically

continued on page 14

taken it out of the skip when KW was moving location and I think I swapped it for an HF receiver. I put it on the air a couple of times but I had other gear and it sat in the cupboard. I finally decided it should go to someone who would look after it and so I sold it last year to a VK and understand it is back on the air.

KW108

It seemed that KW thrived on skunk-works projects. One day a sales rep came in to the lab with a very smart looking CRT with a rectangular display and requiring a relatively low EHT. The KW108 Monitorscope was born at that moment and soon we had a working unit, the drawing office must have had some time on their hands because they produced the drawings for the metal work and it all fitted into the standard KW box. They also produced an extremely ugly shade to go round the tube so that you could see the display in sunlight. This is one of the few things that I actually managed to get into production in my three years with the firm, not a very productive rate.

Finally

It seemed to me that although my salary had finally risen to the £2000 pa level it was time to move on. In 1973 I left to join the International Marine Radio Co Ltd in Croydon, but that is another story entirely. Eventually RGS sold the company to Decca; I believe because they wanted the KW3000. In the end and like so many other British companies KW as it was could never survive the Japanese invasion, but I am proud to have worked there and been a small part of it. βi

REMEMBER: *Leave a three second pause between overs when using repeaters. Someone else may have an urgent message.*

◄ continued from page 13

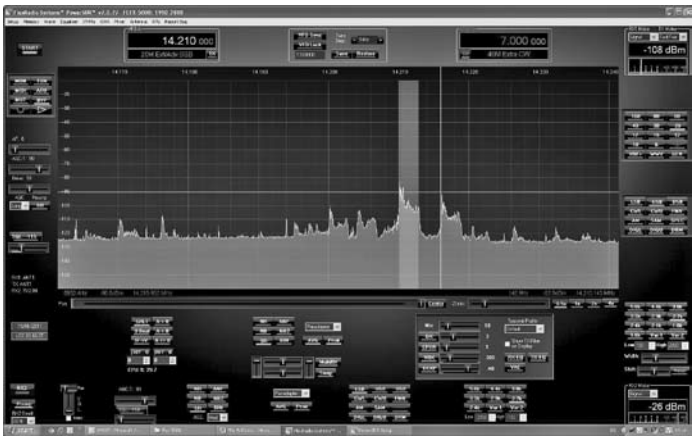


Figure 2. The main Panadaptor display.

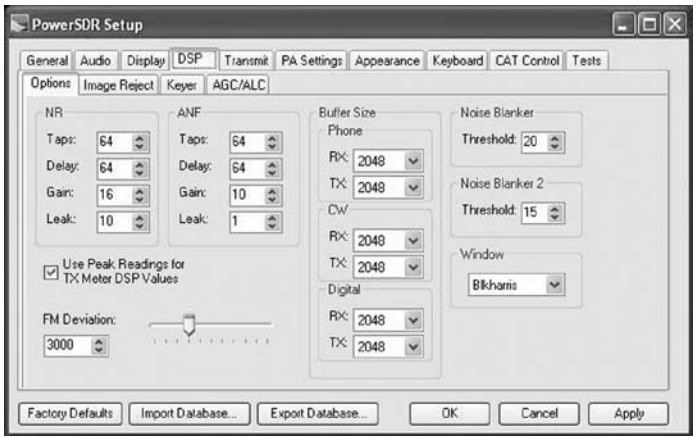


Figure 3. The DSP Options.

incorporates upgrades into a new official version of PowerSDR which is then freely available for download from the Flex Radio website. This approach ensures that not only is the software constantly having new features added but also that as new DSP options become available they can be incorporated into the software. The SDR radio should always remain "state of the art".

Currently significant upgrades occur every few months.

The Display

There are far too many features of the Flex-5000 SDR to cover in a short overview but one or two of the most prominent are worth looking at. Figure 2 shows the main Panadaptor display. (There are, in fact, a variety of "skins" available or you can develop your own personalised display.) The central vertical line indicates the carrier frequency and the light coloured band represents the DSP filter width. IF shift is accomplished by clicking and dragging the light coloured band. There are a number of standard width filters available but any width can be selected simply by clicking and dragging either edge of the displayed filter. The filters are true "brick wall" filters. For example on SSB the 2.4 kHz filter 6dB/60dB bandwidths are 2.39/2.54 kHz, or a shape factor of 1.06, ie the 2.4 kHz filter is only 150Hz wider at 60dB than at the 6dB point.

There are two factors that affect the display, sample rate and buffer size. The sample rate determines the displayable bandwidth and can be set to 192, 96 or 48 kHz. At 192 kHz the displayable bandwidth is 160 kHz. Halving the sample rate halves the display width. The buffer size (512, 1024, 2048 or 4096 Hz) affects the latency, the delay between data in and data out. This is primarily determined by the PC processing power. There is also a trade–off between buffer size, sample rate and the filter shape factor. To a certain extent you can trade display width for shape factor but the effect is small.

There are nine display modes, Spectrum, Panadaptor, Scope (Frequency display), Phase, Phase2, Waterfall, Histogram, Panfall (Panadaptor at the top and waterfall below) and PanScope (Panadaptor at the top and the Scope display below it).

Operation

The most notable difference between a conventional transceiver and the SDR is of course the complete absence of hardware controls. Everything is controlled by the mouse or keyboard. Five different methods are available for frequency control. A frequency can be entered directly from the keyboard, the entire display can be dragged left or right using the mouse, the mouse wheel can be used to move the frequency in predefined steps, or any signal on the display can be moved into the filter by right clicking on the display to bring up a set of cross hairs and then clicking on the signal. The VFO-A and VFO-B frequencies can also be set by placing the cursor on any digit and using the mouse wheel to increase or decrease the selected value. Figure 2 shows an SSB signal in the filter. The cross hairs are placed on a second SSB signal on the display. Clicking on this signal automatically moves it into the filter or it can simply be dragged into the filter using the mouse.

The main receiver can be used in split operation by selecting the "VFO Split" button. VFO-B is then available and can be set to any frequency. By default VFO-A remains the receive frequency and VFO-B becomes the transmit frequency. The second receiver can also be used for this purpose but it is not necessary. This receiver is perhaps best used for diversity reception.

Diversity Reception

The two receivers are phase-locked and by using a different antenna on each receiver, true diversity reception is possible. The phase of the input signals can be varied to either enhance the wanted signal or reduce the effects of an unwanted signal.

Some Pros and Cons

If you have a thing about the PC or cannot imagine a radio without a tuning knob then the FLEX-5000 is probably not for you. (Although there is a device available that has a tuning knob and a few buttons.) One of the strongest features of the SDR is something of a two edged sword. Almost everything is configurable and the huge range of options attached to every conceivable parameter can be a bit overwhelming. If, for example, you don't like any of the five available AGC settings (Fixed, Long, Slow, Medium or Fast) you can set up your own custom AGC by adjusting the Slope, Maximum Gain, Attack Time, Delay Time, Hang Time and Hang Threshold. You can then adjust the "Leveler" Maximum Gain, Attack, Delay and Hang Time. Apply this philosophy to every transceiver parameter and it's just as well that the software as downloaded has all the parameters set to default values and with an option to restore the factory defaults. Figure 3 shows just a few of the many DSP options available.

In Summary

A big advantage of the SDR is the ability to visualise exactly what is required to optimise a signal in relation to QRM. Seeing the problem on the screen allows you to immediately adjust the filter position and width to eliminate the unwanted station or other QRM. Another advantage is the ability to see any signals that may pop up on a marginally open band without the necessity of continually tuning the band.

Some further claimed advantages of the SDR approach are:

- DSP code is not "fixed" in firmware.
- DSP Code is Open source. It is not proprietary.
- DSP hardware can be upgraded easily.
- New radio or operating features are easily implemented with a software upgrade.
- The radio is constantly being improved. It never becomes obsolete.
- Single step conversion from RF to baseband audio.
- Low noise due to eliminated multiple IF conversions.
- Low distortion – distortion is introduced at every conversion stage.
- Does not require roofing filters to improve performance.
- 99% of the signal path is entirely in the digital domain.
- "Repairing" the radio is as simple as reloading the software.

A good source of further information about the FLEX-500A and other Flex radios is <http://www.flex-radio.com/>

Short off-centre fed dipole for 80-10m

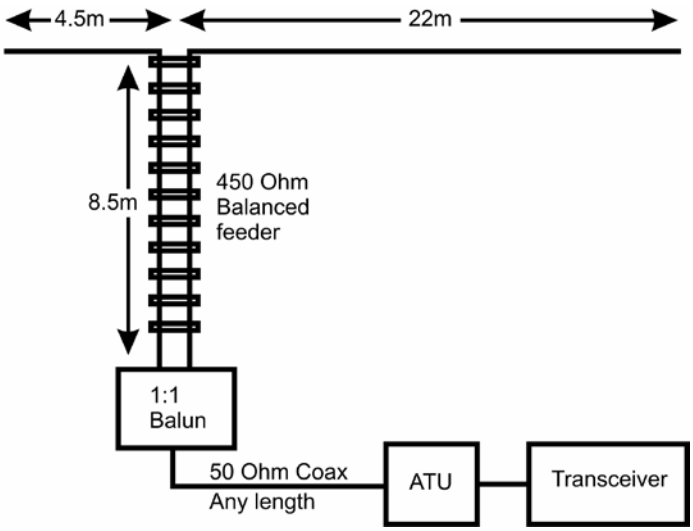
by Jesper Fogh Bang OZ1XB, <fogh.bang@gmail.com>

(Reprinted from SPRAT *No.145, Winter 2010).*

The design of this short off-centre fed dipole was discovered in an old German booklet about Windom and off-centre fed antennas[1]. It is a multiband antenna covering 80-10m. I have built and tested this antenna for several weeks and compared signals with my ordinary 80m dipole. It works fine on 80m despite the short length which makes it ideal for the small garden or for field days.

The feeder can be either 450 Ohm Wireman® or a homemade ladder line. I used a simple 1:1 current balun at the junction between the ladder line and the coaxial feeder together with an ATU[2] close to the transceiver. Obviously, it would be better to have the ATU placed at the feeder junction where the balun is shown on the schematic. however, the present layout is more convenient.

The l:l balun can easily be made as a coaxial cable balun with RG58U wound in a single layer on a non-magnetic form according to the following table: βi



Band	*Cable length (m)*	*Windings*	*Diameter (mm)*
80m	6.1	7	275
80-30m	3	7	135
80-10m	5.5	9	195

References

[1] *Funkamateur Bibliothek* No. 15, June 2000. page 73

[2] Phi-C tuner. *SPRAT* No. 183. Any other type will do the same job.

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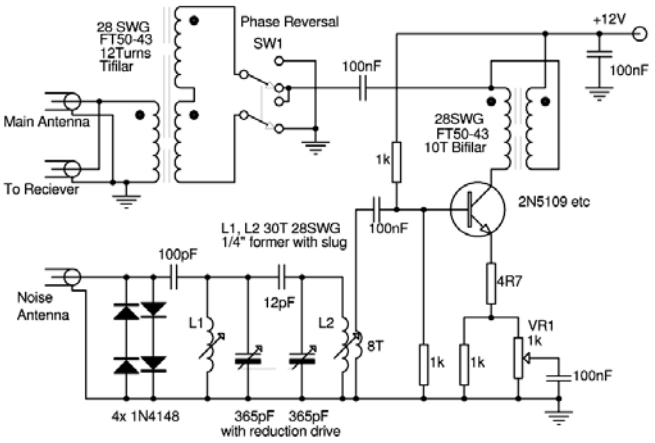

WANTED: copy for *Break-In*

My stock of articles etc for future issues is running low so I appeal to members to assist with material for publication. This could be short or long articles on any topic related to amateur radio and electronics, constructional articles, book reviews, equipment reviews, software reviews, branch activity reports, etc.

I should also like to receive articles on electronics related topics such as auto-electronics, home sound systems, workshop practice; in fact anything that hams might find of interest. Thanks and 73, *John R L Walker ZL3IB (Editor)*

Email <zl2tw@nzart.org.nz>

The plasma nuller

by Pat Smith GW0VMR

(Reprinted from SPRAT *No 145, Winter 2010).*

Earlier this year I built a valve superhet and a 10 watt, all 807 power oscillator transmitter for 80 metres. Then my next door neighbours bought a plasma TV. That was the end of all my hard work because the QRM from the TV completely wiped out the lower HF spectrum.

With this null steerer I am able to completely null out the neighbour's plasma TV; without the nuller the 80m band is unusable. Connect the nuller to your receiver with only its noise aerial connected and align L1 and L2 for maximum signal as you would for any receiver front end. Next connect your main aerial.

In use, tune the variable capacitor for maximum noise then gently adjust the variable capacitor (phase) whilst at the same time adjusting the gain pot. If you are unable to get a null, throw SW1 and start again. It is a fiddly procedure and both controls are interdependant.

The secret of the nuller's success is a good noise aerial. My own is is 70ft of wire, coax fed run very low down and wound around my garden shed, and with the aerial as close to the source of noise as possible. The nuller reduces most forms of local QRM at this QTH; even my old BC221. As shown, the nuller's range, is from 3 MHz to 11 MHz. The building of the nuller has been the saving of my hobby. My hope is that it will be of similar use to others. βi

Minutes of the NZART Annual General Meeting 2011

Held at Silverstream Retreat. Saturday 4 June 2011

1. Welcome

The President, Roy Symon ZL2KH, commenced the meeting at 8:30am. ZL2KH advised specific rules of the AGM. Debate must be polite, discussion to be kept to policy not personalities, anyone transgresses, they will receive a red card and be removed from the meeting.

ZL2KH welcomed the President of WIA Michael Owen VK3PI and Treasurer John Langayroux VK3PZ.

2. Apologies to the AGM

Branches; Kawerau Branch 67, Cambridge Branch 04, South Canterbury Br 34, South Otago Branch 35, Raglan Branch 83,

Members; Bruce Douglas ZL2WP, Alan Chapman ZL3GX, Leith Jackson ZL1BCJ, Bev Osborne ZL1OS, Jamie Pye ZL2NN, Bev Gillman ZL3OV, Geoff Gillman ZL3QR, Lee Jennings ZL2AL, Andrew Mackie ZL2HZ, Raymond McNickle ZL1RGM, Martin Balch ZL4JH, Bill Luscombe ZL2AVL, Lorne Douglas ZL2AHB, David Hetherington ZL3UDH, Nigel Murray ZL1AUH, Brian ZL2ADL & Cathy ZL2ADK Purdie, who were to attend this AGM and are presently assisting Police on a search and rescue operation in a homicide enquiry.

Other apologies from the floor of the AGM were ZL3TVS, ZL1FS, ZL1WAL, ZL1BOK, ZL4GJ.

3. Silent Keys

ZL2KH called for a minute's silence in respect of silent keys, specifically Neville Copeland ZL2AKV, Life member of NZART and General Secretary for 16 years.

The President then requested that all cell phones be turned off. ZL2KH then advised he was filling in time by continuing with general housekeeping, before the official opening of the meeting, while awaiting the arrival of Chris Hipkins MP for Rimutaka.

4. Confirmation of Quorum

A Quorum of 1485 was confirmed.

5. Incoming Councillors

Incoming Councillors Stephen Hayman ZL1TPH, Warren Harris ZL2AJ Simon Lewis ZL4PLM and Terry Thomas ZL4TAE were presented with their Council badges.

6. Report on Council Business

ZL2KH presented the report on Council Business. Council met at the Silverstream Retreat commencing at 9am on Friday 3 February.

Incoming Council members, Warren Harris ZL2AJ, Stephen Hayman ZL1TPH, Simon Lewis ZL4PLM and Terry Thomas ZL4TAE were welcomed to the meeting and given full speaking and voting rights.

Council elected Vaughan Henderson ZL1TGC as Vice-President. Vaughan was elected unopposed.

Following a suggestion from Evan Sayer the Association Treasurer, Council agreed that a review of the current NZART Constitution is to be undertaken. One of the main aims of this review is to gain charitable status and potentially save having to pay tax.

Council formally approved a submission from the Radio Electronics Group granting them Branch status.

Council again thanked Evan Sayer for ensuring the Association's financial audit was completed in a timely and professional manner.

Council resolved that subscriptions for 2012, will remain at $95 for Transmitting/Non-Transmitting individual memberships. Those members who pay their subscriptions before 30 November, will go in a draw to win a dual band handheld radio.

A membership promotion will be run this year, with a further handheld being offered as a prize. Payment for new members must be received by the 31 December. Council are very conscious of falling membership and wants to encourage newcomers to the Association. A membership drive with the opportunity to win a prize may assist in increasing members to the Association. More details of this will be advised in HQ Info-Line.

Council also wish to emphasise the need for all Branches and members to subscribe to *HQ Info-line.* This was an initiative by Jim ZL2BHF some years ago and is now scribed by Jamie Pye ZL2NN, as a form of communication to members between the bi-monthly issues of *Break-In* and the monthly Official Broadcast. *HQ Info-line* is sent via e-mail fortnightly and contains many updates from Council, FMTAG, Awards etc so that members get the most up to date information. To make sure that you receive *HQ Info-line,* just complete the details on the NZART webpage. It is also advisable to take it to branch meetings for those who are not on the internet.

Finally Council recommends to the AGM, NZART Life Membership to Doug Ingham ZL2TAR which was received with acclamation. Doug who had not yet arrived at the AGM was presented his badge and certificate after morning tea.

7. Official Welcome and Opening

At 9am Mark Gooding ZL2UFI, Conference Committee Chairman, then introduced Chris Hipkins MP for Rimutaka. Chris welcomed everyone to Upper Hutt.

Mark then welcomed everyone and gave a brief run down on the history of the venue. It was once a base hospital for the US Marine Corps, which in its time boasted a patient by the name of Don Adams (of Maxwell Smart agent 86 fame) and was visited by Eleanor Roosevelt.

Stuart Watchman ZL2TW gave a very insightful account of his traumatic experience during the 22 February earthquake in Christchurch, where he was attending a medical conference at the Grand Chancellor Hotel.

8. Confirmation of Minutes 2010 AGM

Moved ZL3TNT Seconded ZL2LS **Carried**

9. Annual Accounts

Annual accounts – Evan Sayer

Motion: That the annual accounts be adopted as published in the March Break-In. Moved Evan Sayer Seconded ZL3MJS **Carried**

Evan addressed the meeting, by advising that in 1998 the Association was essentially showing a deficit in excess of $200 000, in 2010 saw a balance of over $230 000, essentially having turned the Association's financials around by half a million dollars in 13 years. A great effort by members.

10. Appointment of Association Auditor

Motion: That Parsons Roddick be appointed as the Association's annual auditors. Moved Evan Sayer Seconded ZL2WAU **Carried**

11. Officers' Reports as published in *Break-In*

All reports as printed in *Break-In* were accepted.

Moved ZL2HD Seconded ZL2LS **Carried**

12. Remits

Remit 1

Napier Branch 25 **Carried on vote count**

Result 851 in favour, 434 against.

Remit 2
Hawkes Bay Amateur Radio Club **Lost on voices**

Remit 3
Hawkes Bay Amateur Radio Club **Lost on voices**

Remit 4
Hawkes Bay Amateur Radio Club **Lost on voices**

A break at this time saw the presentation of a new award. Nelson Branch President Paul Moffatt ZL2PO and Letitia Scott ZL2LS advised members that Nelson branch, on approval from NZART Council, are sponsoring an award in recognition of those candidates who achieved a 100% Examination Pass and who would otherwise not be eligible for other awards.
There were three recipients for the 2010 year:

Suzette James ZL2SGC	Nelson Branch
Jonathan MacKenzie ZL3JDM	Christchurch Branch
Murray Smith ZL2MJS	Lower Hutt Branch

Remit 5
Hawkes Bay Amateur Radio Club **Lost on voices**

Remit 6
Hawkes Bay Amateur Radio Club **Lost on voices**

Remit 7
Hawkes Bay Amateur Radio Club

Christchurch branch moved that 160 metres also be included in this remit

Amendment. Moved ZL3RX Seconded ZL3MJS **Carried**
Remit put to vote **Carried on vote count**
796 in favour, 722 against

Remit 8
Wellington VHF Group Branch 74 **Lost on vote count**
688 in favour, 739 Against

Remit 9
(Non Transmitting) Marton & Districts Branch 23 **Lost on voices**

Remit 10
Members Remit (Clause 6.6 b ii NZART Constitution) **Lost on voices**

Remit 11
CARDS **Lost on voices**

Remit 12
CARDS **Withdrawn**

Remit 13
Manawatu Branch **Withdrawn**

13. Presentation of Rothschild Cup

The Rothschild cup was this year awarded to North Shore Branch 29, for having 13 successful examination passes in 2010.

14. Fixing of venue for 2012 Conference

Topsy ZL2LS on behalf of Nelson Branch invited all attendees to the annual conference in 2012 which will be held at the Tahuna Beach Conference Centre.

15. Presentation of the Youth Achievement Award

The Youth Achievement Award for Best Examination result, went to Thomas Fellowes ZL3PSG, aged 16 of Christchurch West Branch who gained 55 marks out of 60.

As there were no nominees for the Young Amateur of the Year Award, the new sponsors of this award, Nelson Sound, generously donated a 2 metre handheld radio to Thomas for his excellent result, further encouraging new young amateurs to the hobby.

16. General Business

a) Mike Barnes ZL3TMB moved a motion of 'No Confidence' in Councillor John Andrews ZL2HD. Seconded by ZL3MJS. Citing recent alleged events at a face to face meeting of Council, requiring NZART membership money to be spent on legal counsel to sort the matter out.
Evan Sayer corrected Mike and advised no legal costs were incurred in an alleged legal threat. Mike apologised to the floor and to John Andrews and withdrew the motion.

b) Bruce Means ZL3BM moved "That a vote of No Confidence be placed on Council in attendance at the face to face meeting in February 2011". This was seconded by ZL2TDD but was lost on voices.

c) Stephen Cooper ZL2WAU of Tararua Branch asked branches to look through their archives for any amateur radio videos or DVDs here in New Zealand, that can be used on their Tararua Regional TV station which will soon also be broadcast on other Regional TV stations.

d) Stephen Cooper ZL2WAU also asked that the NZART website be re-vamped as the font size was too small and too content heavy. ZL2KH advised Stephen to contact Jamie Pye ZL2NN Webmaster with possible solutions.

17. Amateur of the Year Award

This award was given to David Searle ZL3DWS for the tremendous results he achieved with the Buildathon projects (Christchurch West Branch 56, with support from Br 05 and 68). As David had moved to Australia, Terry Carrell ZL3QL accepted the award on behalf of David and undertook to pass the award on to him.

18. Arthur Godfrey ZL1HV Branch Awards

The recipients of this award for outstanding service at a Branch level were: Neil Gibbons ZL2TNG and Maurie Vile ZL2ADP from Upper Hutt Branch; Paul (Jono) Jonassen ZL1UPJ from Hamilton Branch; Topsy Scott ZL2LS from Nelson Branch and Maurice McNab ZL3MEM from Christchurch West Branch.

The citations for all these awards will appear in the August issue of *Break-In.*

19. Certificates of Service

Outgoing Councillors Tony Case ZL1UD, Topsy Scott, ZL2LS, Max Wheatley ZL2MAX and John Lochhead ZL4QS, were presented with their Certificates of Service.

20. Stirrer's Award

Topsy Scott, ZL2LS for trying unsuccessfully to seduce the President prior to the AGM in her red nightie.

Sharon Dawson, Owner of ICOM NZ and daughter of founder Dave Dawson ZL1TJU spoke to the meeting offering all attendees at conference 5% discount on all gear sold at the AGM. She advised ICOM will be attending the Nelson conference in 2012.

Meeting closed at 2:59pm

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Arthur Godfrey ZL1HV Branch Awards

Letitia (Topsy) Scott ZL2LS

In 2004 Topsy organised the conference in Nelson, along with other members of the club. She is also involved in the organising of the upcoming conference in 2012. Topsy is also Branch 26 examiner/supervisor. She has been involved in running very successful introductory nights for our branch and assisted in subsequent examination programmes to introduce more Amateurs to the hobby.

She is tireless in her efforts at branch level, eg assisting with AREC (with Dave ZL2BCA) helping with comms for annual car rallies and introducing the Nelson Amateur Radio Girls (NAG Net). This has run every Wednesday night for nearly two years now. The ladies really love it. Christmas and social functions for club usually begin with an idea from Topsy.

Topsy spends hours coordinating operators and drawing up route planners for operators so that on the days of the events, things run smoothly. She, along with Dave ZL2BCA, are always first to be at an event and the last to leave. She checks up on all the operators to make sure they feel confident and that they all understand what is expected of them.

She accepted the appointment to Council when the Midlands region Councillor resigned. She had little time to look at this offer, but took it on with her usual zeal.

Topsy has also joined WARO and has encouraged other ladies from Branch 26 to join. She, along with the others, gets on the WARO net on Monday nights to have a catch up with other WARO members. Along with all this Topsy has been "On Air Minute Secretary" for Council for the past three years.

When it comes to amateur radio, Topsy is very proactive in promoting the hobby to others. She shows people that it can be a lot of fun and a very social hobby. Whenever the club needs volunteers to help out, she is always there, boots and all.

Paul Jonassen (Jono) ZL1UPJ

Paul has been a keen member of the Hamilton Amateur Radio Club (Branch 12) and NZART for over 15 years. Jono is well known as a skilled operator who enjoys sharing amateur radio with others. This is demonstrated by Jono from time taking responsiblity for the club engagement with regional scout and guide groups through camps and JOTA's. He is recognised for his patience and skill in introducing radio to others. He is active in many aspects of radio modes.

Jono has used his skills as a knowledgeable technician to support and develop new HAMS and has led the branch training programme for many years. He guides new operators to develop into active club members, promoting the value of the club, the value of NZART and the value of being a member of the ham community. Several of the current branch 12 committee members are people that Jono has fostered into active contributors to the club through his efforts and mentoring.

Jono's effort in AREC is cornerstone to the ability of the club to service the Waikato community, through providing safety communications for a wide range of events. Over a long period, Jono has been relied on to develop the branch STSP repeaters (2m & 70cm), placement of repeaters for events, ensuring that equipment is available and functioning for special events and the manning of the difficult operational sites. This long term commitment has included events such as: Hamilton to Whangamata Cycle Race, Bridge to Bridge Water Ski races, Kona Car Hill Climb, Hamilton Hot Air Fiesta, North Island Secondary School cycling Championships and others.

Work teams appear to always include Jono, making a meaningful contribution whether it is clearing the spouting, moving antennas, dismantling equipment for fundraising; Jono is there leading the charge and encouraging others to contribute. Not that many can at the same level of energy or consistency. His contribution to the club is often discreet and as a result often goes unnoticed or acknowledged by those that benefit from his efforts.

One of the key ham radio events in the region is the Branch 12 Market Day. Jono has been a supporting member of the market day team for over 15 years. Doing what needs to be done to make the market days successful. He has made a real difference. Many of us do not understand the volumes of effort that go into making such events happen.

Jono enjoys visiting and participating in club events around the region. He periodically attends other branch meetings to build stronger relationships, friends and ties with clubs in the region. As a result Jono is a well-known operator and character in the region. These contacts have helped Branch 12 to support larger AREC events the club would otherwise not be capable of.

A number of Jono's colleagues attest to his overwhelming commitment to ham radio and attribute their enjoyment of the hobby to the introduction and support that Jono has given over a very long period. These people now consider Jono a good friend and indicate they accredit their skill and participation to the time and effort Jono contributed.

Maurice McNab ZL3MEM

Ever since Maurice joined the Christchurch West amateur radio club, Branch 56, he has consistently made a positive contribution to our club's well-being.

Every Tuesday, he opens the clubrooms and the Radio Shack and gets the Club Station ZL3VV on to the air. Maurice and the members who joined him on their regular Tuesday evenings operated HF Bands and as a consequence our club has become well known by DXers worldwide. As a result of this activity many new members have obtained their Amateur Radio licences and then became branch and NZART members.

The committee purchased a new Icom T2000 which Maurice made his mission to learn thoroughly and then deliver a lecture and demonstration at a club monthly meeting. It would appear that the Icom had a design fault in the receiver which Maurice researched and organised a repair.

Maurice has been involved in the club management for the last few years rising to Club Vice-President. When Maurice's wife Marinel became very sick, Maurice was still able to make the effort to contribute to the club. When he later suffered an industrial accident we still saw Maurice at the club.

Maurice has also involved himself in the Branch 05 AREC organisation and every year can be found helping the Speights Coast to Coast race.

Maurice has also encouraged his wife Marinel to be branch auditor; a duty she has performed with a integrity and professionalism.

EastFest 2011

Ashburton Senior Centre, Ashburton

Sat 10 September – Sun 11 September

NZART CONFERENCE 2012
BRANCH 26

Tahuna Beach Conference Centre, Nelson
Queen's Birthday weekend (1-4 June 2012)

Maurice (Morrie) Vile ZL2ADP

1. Morrie took over the role of AREC Section Leader in 2005, and commenced to re-organise the AREC Section within the club. He quickly established himself in the role, and showed great planning and leadership immediately after taking the role on.
2. As part of his new role, Morrie also took on the position of Equipment Manager, to ensure that all the emergency equipment held within the club was accounted for, up to operating condition and if not have it repaired and returned to service. He then commenced bi-monthly checks of the equipment that were presented to the committee of the club so that any areas of concern would be addressed immediately, and corrected where required.
3. Morrie was involved in planning many events from 2005 until he resigned from his position in May 2010 (his resignation was that he was moving to the Wairarapa and was not physically located in Upper Hutt any more). These included the Big Coast events of 2006 and 2007, in-house training of branch members from 2005-2010, and the running of the Jock White Field Station also from 2005-2010.
4. Morrie was also a keen participant in the Lighthouse and Lightship Weekends, supporting the club and its membership to prepare and take part in this annual exercise/contest. This provided a great training exercise for members to hone their skills in antenna building and field operation of the branch's equipment. A great AREC training opportunity.
5. Morrie also as part of his AREC position was always looking for various means to assist the branch and members to get on the "air", and to this end he developed what was later to become the "Branch 63 Black Stick Dual Band Antenna". Easily made and re-produced by members with little cost and effort. This antenna construction was published in *Break-In*.
6. Morrie was able to also seek out new training opportunities for club members to practice their AREC skills, as various community based events came and went over the years. In particular he was able to secure the Kapi-Mana Motor Cycle Club events, which have since proven invaluable to the members of the branch as the events take place in many areas where people go missing in search and rescue operations. Proven local knowledge gained in this area has probably saved not only time and materials when searching, but probably lives as well.
7. Morrie has also been a strong supporter of the Wellington Radio EXPO, now into its seventh straight year. He has been the "voice" of the Talk-In Station on 730 for those amateurs calling in for assistance or directions on how to get to the venue. Although he is now "out of district" he has again taken this role this year, 2011. In fact he has offered to do the same Talk-In Station for this year's Conference that is based in Silverstream in June of 2011.

Finally, although Morrie has moved away he continues his involvement in the club and its activities where possible, and is still heard on the local repeaters especially the new 23cm Repeater, continuing to show his interest in amateur radio.

Neil Gibbons ZL2TNG

1. Neil has been a member of the Upper Hutt Branch for a number of years (more than thirty years), and has held many positions within the club over this period, from President to Repeater Trustee.
2. Neil's major activity in the last ten or so years was that of Repeater Trustee. He, together with other trustees, over the years has provided many hours of effort to keep the branch's repeaters, operating at Mt Climie up to the required high standard that has become expected.
3. Neil, although not physically located in Upper Hutt, but at Raumati South, nevertheless spent a great deal of time to keep the repeaters in good working order. He was continually a source of encouragement to new members to come on board on his many trips up the hill, to show them the way, and involve them in the maintenance of the repeaters. Neil is also a great constructor of antennas, and many a time would turn up at the club with a 'new set of dipoles' for one of the repeaters for Mt Climie.
4. Neil also provided great technical assistance to the club on all matters to do with radio, and to outside organisations as well, especially when it came to historical knowledge of the site, and who had done and tried what over the years. This knowledge proved itself when the club entered into a Memorandum of Understanding (MOU) with the Greater Wellington Regional Council over site access and ownership issues.
5. Neil has also been a strong supporter of the Wellington Radio EXPO, now into its seventh year. He ran the club's sale table at this event providing a great service as a way to gather funds for various projects the club was looking to be involved with, especially as much funding went towards the repeaters based at Mt Climie.
6. Neil fully supported AREC activities within the branch and greatly assisted the club when involved in the Kapi-Mana Motor Cycle events, as being based in Raumatai South he was able to save many an hours travel for club members as he took the position on his side of the hill, in the big Enduro Events.
7. Neil resigned his position of Repeater Trustee in April 2010, due to travel costs and wishing to pursue his other activities, beside amateur radio. He still provides assistance, support and where possible physical support of the new repeater trustees as they take on the role he held for more than ten years. The fact that Climie 730 has become the defacto channel for amateurs to use in and around the greater Wellington area and lower North Island, are a testament to his work and effort to maintain and support amateur radio.

Finally, although Neil resides away from Upper Hutt, he continues his involvement in the club and its activities where possible, and is still heard on the local repeaters continuing to show his interest in amateur radio.

IARU – International Amateur Radio Union

Liaision Officer:
John Lochhead ZL4QS

IARU Liaison Report

The IARU meeting at the NZART Conference in Upper Hutt was well attended and it was great to see some new faces at the meeting. Attendees at the meeting were:

John Lochhead ZL4QS (Chairman), Terry Carrell ZL3QL, Roy Symon ZL2KH, Peter Lake ZL2AZ, Fred Johnson ZL2AMJ, David Andrews ZL2SX and Don Wallace ZL2TLL. A special welcome to Terry Thomas ZL4TAE and Stephen Hayman ZL1TPH for taking time out and coming along to find out what IARU is all about. We also welcome the input given by our Australian guests Michael Owens VK2KI and John Longayroux VK3PZ.

Papers for 15th IARU Conference

The committee is starting the task of organising papers for the conference and we would appreciate any new ideas or topics that members would like to be covered at the IARU Region 3 conference next year.

15th IARU R3 Conference Vietnam October 2012

Discussion took place on the subject of the number of people that need to attend. It is important that we have good representation in the three major working groups of the Conference; Technical, Administrative, and Finance. It is very likely that one of our number will be appointed to chair at least one of these forums.

WRC-12 Geneva January/February 2012

The WRC-12 will be held in Geneva in January / February 2012 and the committee has recommended that NZART selects a person to be in the National Delegation to this very important world meeting.

Jamie Pye ZL2NN

It is with deep regret that the committee notes the sad passing of one of NZART's stalwarts of IARU Region 3 and IARU worldwide. Jamie was a proud supporter of NZART's activities in IARU and has been on the NZART IARU Liaison committee for many years. We extend our deepest sympathy to Jamie's family at this sad time

I have subscribed to the IARU E-Letter and hopefully snippets of information about IARU should filter through, which will then be forwarded onto *Break-In* so that readers can get an insight into the working of IARU. Rod Stafford W6ROD writes in easy read English and I must thank Rod for allowing the E-Letter to be made available to New Zealand Amateurs.

John Lochhead ZL4QS
NZART IARU Liaison Officer

The ITU – International Telecommunication Union

If you were to ask most amateur radio operators what entity is responsible for granting privileges to use portions of the radio spectrum for amateur radio purposes the answer would likely be their own national telecommunication authority. However, that's only partially true. The ultimate authority for the use of the radio spectrum is the International Telecommunication Union (ITU). It is desirable that each amateur radio operator understand what the ITU is and why its work and decisions are important.

Most countries are Member States of the ITU and by way of treaty generally agree to be bound by the decisions of the ITU when it comes to the usage of the radio spectrum. Each country can decide that a certain use determined by the ITU may not apply in their own jurisdiction. It is not common for countries to do that but it is within their sovereign authority to do so.

The International Telecommunications Union is a United Nations agency that deals with information and communications technology issues. They have an extensive website at <www.itu.int> that details much of their work. The ITU is based in Geneva, Switzerland and includes in its membership 192 Member States and more than 700 Sector Members and Associates.

The top staff official of the ITU is its Secretary-General, Dr Hamadoun Toure who is also a licensed radio amateur with the call-sign HB9EHT. There are three sectors in the ITU: Radio- communication (ITU-R), Development (ITU-D) and Standardisation (ITU-T). The IARU is a Sector Member in both the ITU-R Sector and the ITU-D Sector. The IARU is a recognised international telecommunication organisation and is invited to participate as an observer at the Plenipotentiary Conferences. The most recent "Plenipot" was held in October, 2011 in Guadalajara, Mexico.

The ITU Council was established in 1947 under the name Administrative Council, following a decision taken by the 1947 Plenipotentiary Conference in Atlantic City, New Jersey, United States. The Council comprises a maximum of 25% of the total number of Member States, which are elected by the Conference with due regard to the need for equitable distribution of Council seats among the five world regions (Americas, Western Europe, Eastern Europe, Africa, Asia, and Australasia). The current Council is comprised of 48 members.

The role of Council is to consider, in the interval between Plenipotentiary Conferences, broad telecommunication policy issues to ensure that the Union's activities, policies and strategies fully respond to today's dynamic, rapidly changing telecommunications environment.

The ITU-R Sector is very important for radiocommunication services, including the amateur and amateur-satellite services. Every 4 or 5 years the ITU holds a World Radiocommunication Conference (WRC) to revise the international Radio Regulations. It is the job of WRC to review, and, if necessary, revise the Radio Regulations, the international treaty governing the use of the radio-frequency spectrum and the geostationary-satellite and non-geostationary-satellite orbits. Revisions are made on the basis of an agenda determined by the ITU Council, which takes into account recommendations made by previous world radiocommunication conferences. The general scope of the agenda of world radiocommunication conferences is established four to six years in advance, with the final agenda set by the ITU Council two years before the conference, with the concurrence of a majority of Member States. The next WRC is scheduled for 23 January to 17 February 2012, just one year away.

Under the terms of the ITU Constitution, a WRC can:

1. Revise the Radio Regulations and any associated Frequency assignment and allotment plans;
2. Address any radiocommunication matter of worldwide character;
3. Instruct the Radio Regulations Board and the Radiocommunication Bureau, and review their activities;
4. Determine Questions for study by the Radiocommunication Assembly and its Study Groups in preparation for future Radiocommunication Conferences.

There is a lengthy preparatory process for every WRC in which the IARU participates as a Sector Member. There are usually countless meetings dealing with each agenda item that has been determined to be on the agenda for a WRC. Many of those agenda items can, and do, have a substantial impact on the amateur radio usage of portions of the radio spectrum. It is important for the IARU to participate to "protect our frequencies" and when the opportunity presents itself, to expand our spectrum.

ITU-R Study Groups and Working Parties address each agenda item on the WRC agenda and try to arrive at a consensus and recommendation(s) how the agenda item may be addressed or dealt with at the WRC. Studies are conducted many times to determine how a proposed new usage may impact the other services, or not. Each of these agenda items are thoroughly discussed for at least a couple of years leading up to the WRC. You can imagine how important it is for the worldwide amateur community that IARU participate in the entire study group/working party process.

ITU-D is where much of the ITU's work on disaster response takes place. The development arm of the ITU considers emergency telecommunications an integral part of its projects integrating telecommunications/ information and communication

FMTAG – Frequency Management and Technical Advisory Group

Secretary: Doug Ingham ZL2TAR
<fmtag@nzart.org.nz>

Reminder number 1: FMTAG email address

FMTAG has only one email address: <fmtag@nzart.org.nz>.

Please send all emails to this address, rather than to individual members of FMTAG, to ensure that all the members of FMTAG receive the message and that you will receive prompt attention during the absence of one, or more, members of FMTAG.

Reminder number 2: Publication of applications

Break-In is NZART's "Journal of Record" and is published six times a year. The two-month gap between magazines, and the three week magazine production period, means that some of the information in these FMTAG notes can be nearly three months old, when received by members.

Applications are also published, within a few days of receipt, on the NZART website, and at intervals of two or three weeks in HQ InfoLine, in accordance with the NZART Council Procedure, published on page 1-9 of *Call Book*.

Members interested in FMTAG matters are encouraged to keep up to date by taking advantage of these electronic publications.

Reminder number 3: Transfer of licences

Branches are invited to request the transfer of their Repeater/Beacon/Link Licences, from being in the name of NZART to being in the name of the Branch. The MED licence transfer process requires the Branch to have activated its MED SMART Account, to be able to accept the licence transfer. FMTAG can provide details of the process.

To minimise the MED fee, there is an optimum time window for the transfer, which is during the month PRIOR to the licence renewal month. Most licences come due for renewal in November, so their optimum transfer month is October. However, a few licences come due for renewal in August, September, December and January.

Last year, the licence transfer module of SMART stopped working in mid October, and wasn't restored until early November, after the optimum time window for transfers had closed. An early transfer request can avoid disappointment.

Outage of MED web-based services

Members will be aware that all of the MED's web-based services were off-line on 18, 19 and, for part of, 20 May. The impact on the Amateur Radio Service was relatively minor: repeater licence applications could not be processed during the outage.

However, the same problem that affected the call-sign list, provided by the MED for the current *Call Book*, has re-appeared: all of the temporary call-signs that have expired in the last two years are being displayed as if they are still valid.

We await an updated report from the MED.

Proposals

That 146.600 MHz be added to the NZART Bandplan for P25 Simplex.

Branch 63 Upper Hutt has applied to add the D-STAR DV digital mode to, and change the location of, its Mount Climie 5425 repeater. The new location will be Topo50 map reference BP32 798.83 423.94. An Engineering Evaluation, in accordance with the MED's Radio Licence Certification Rules (PIB38), shows that the repeater's transmit frequency can remain on 145.425 MHz and the receive frequency can remain on 144.825 MHz, and that there will be no interference to other stations.

Branch 66 Auckland VHF has applied for a D-STAR DV digital mode repeater at Klondyke, Topo50 map reference BC32 602.01 641.50. The repeater's transmit frequency will be 145.650 MHz and the receive frequency will be 145.050 MHz. An Engineering Evaluation, in accordance with the MED's Radio Licence Certification Rules (PIB38), shows that there will be no interference to other stations.

Final recommendations approved by NZART Council

Branch 53 Te Puke has applied for an APRS Digipeater at Shaw Road, Topo50 map reference BE37 870.20 014.96. The transmit and receive frequency will be 144.575 MHz, in accordance with the band plan.

Branch 63 Upper Hutt has applied to add the D-STAR DV digital mode to, and change the location of, its Mount Climie 860 repeater. The new location will be Topo50 map reference BP32 798.83 423.94. The repeater's transmit frequency can remain on 438.600 MHz and the receive frequency can remain on 433.600 MHz.

Branch 74 Wellington VHF has applied to increase the power of, and add the P25 digital mode to its 6625 repeater located at Hawkins Hill, Topo50 map reference BQ31 449.78 236.89. The repeater's transmit frequency can remain on 146.625 MHz and the receive frequency can remain on 146.025 MHz.

Branch 74 Wellington VHF has applied for a 32 cm repeater located at Colonial Knob, Topo50 map reference BP31 513.58 426.16. FMTAG has chosen a repeater transmit frequency of 927.800 MHz and a receive frequency of 921.200 MHz.

Branch 74 Wellington VHF has applied for a 6 m repeater located at Colonial Knob, Topo50 map reference BP31 513.58 426.16. FMTAG has chosen a repeater transmit frequency of 53.750 MHz and a receive frequency of 52.750 MHz.

Branch 85 Mercury Bay has applied for a National System repeater located at Opito Bay, Topo50 map reference BA35 513.81 313.73. FMTAG has chosen a repeater transmit frequency of 434.800 MHz and a receive frequency of 439.800 MHz.

Branch 85 Mercury Bay has applied for a National System UHF Linking Station (ULS) located at Opito Bay, Topo50 map reference BA35 513.81 313.73, to link to Mt Edgecumbe. The link transmit frequency will be 434.975 MHz and the receive frequency will be 439.975 MHz.

Comments and applications

Please send your comments and suggestions on the above matters, and on any other FMTAG matters, by e-mail to: <fmtag@nzart.org.nz>.

Applications for repeaters, beacons, digipeaters, point-to-point links, and so on, should be made on the latest version of FMTAG Form 10. The latest versions of FMTAG Form 10, and the explanatory Form 10A, are available on the NZART website: <http://www.nzart.org.nz/fmtag/index.html>

Completed forms should be sent by e-mail to <fmtag@nzart.org.nz>.

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technology in disaster predication, detection, and alerting. Emergency Telecommunications play a critical role in the immediate aftermath of disasters by ensuring timely flow of vital information which is much needed by government agencies, and other humanitarian actors that are involved in rescue operations and providing medical assistance to the injured. IARU's task in the ITU-D Sector is to ensure that amateur radio's role in disaster communications is understood and appreciated by the ITU members. The ITU-D Sector also conducts a worldwide conference. In 2010, the WTDC was held in Hyderabad, India in late May and early June. IARU participated in the conference.

The ITU also sponsors regional and global exhibitions called TELECOMS. An ITU Telecom offers a global ICT community platform that gathers stakeholders from across the telecommunications/ICT sector to connect, collaborate and create the future ICT landscape. Forums or seminars related to ICT are conducted at the Telecoms and IARU has participated in such forums, usually on topics related to emergency communications.

In one of the ITU buildings, there is a permanent amateur radio station, 4U1ITU. 4U1ITU is the club station of the International Amateur Radio Club.

In an upcoming IARU E-Letter, I will describe the organisation of IARU and how it works within the ITU and the regional telecommunication organisations like CEPT, CITEL and APT to ensure amateur radio's continued place in the radio spectrum landscape.

73, *Rod W6ROD*

VHF Scene

Stephen Hayman ZL1TPH <zl1tph@xtra.co.nz>
Simon Watt-Wyness ZL1SWW <zl1sww@nzart.org.nz>

6m DX

Even through these impending winter months, there has been a few spots of ZL video being heard in VK 2/3 and 4 and also reports of ZL video coming into Bob K6QXY's QTH as strong F2 propagation. ZL50GH was also worked 599 by VK4DDC on 12 June.

1 May had Kerry ZL2TPY and Bob ZL1NX working into JA as well as Rod ZL3NW being busy with the VK2/3 stations around 14 May.

Around 6 June some national backscatter contacts were had as well as Mark ZL2WHO working into VK4 & 5 with good signals, Ross ZL3ADT also working some DX to VK.

10 June saw John ZL3AAU working VK3AUU. The list goes on through mid June with good contacts out of the South Island.

2m Activity

The last couple of months have seen some activity inside ZL with contacts from ZL2WHO to ZL3NW at 419km as well as Bob Zl3TY working some meteor scatter (MS) contacts to VK1/2&3.

ZL2BX worked VK4VDX via AO-51. Starr ZL3CU and Peter ZL4LV have been active on MS with Rex VK7MO.

SHF Bands

Steve ZL1TPH has been modifying his 3400 MHz transverter with an OCXO as well as a new PLL local oscillator. Steve claims his TX output has risen as a result of higher LO injection. A test contact between Steve and Simon ZL1SWW at 41km with Steve just running a 6dB feed horn without the dish. The path was no means optimal as Simon's QTH perspective north is not good with a cliff and Rangitoto Island in the path. Good contacts were made and it was noted that there was no perceivable drift throughout a long QSO. That was with both transverters being PLL based, one having OCXO and the other having a TCXO reference oscillator at 10MHz. Some testing was also done with dish feeds.

Around the shacks …

Peter ZL4LV reports; "My aerial array that featured on the front cover and in the VHF Scene of the last issue of *Break-In* suffered some damage during a wind storm that affected Dunedin in May. The aerials themselves were not damaged but the supporting mast, a 50mm diameter 6mm wall aluminium tube suffered a bend at its base. What happened was that two turnbuckles use to tension the array had unwound, probably due to the natural twist in the ropes untwisting when under tension. Moral: lock turnbuckles.

The whole array is tilt over so when it was at ground level an attempt was made to straighten the mast in situ. This was not successful so the decision was made to remove the mast and invert it so the bend which was not severe and to place it at the top of the structure. This involved dismantling everything and the reassembling again. A considerable task; again my thanks to David ZL4DK for the help given. During this rebuild some additional stabilising rope guys were added. Structures like this are inherently unstable and are vulnerable to extreme weather conditions. My QTH is located on a ridge on a local hill at an altitude of 200m, an excellent view and take off in most directions but exposed to the weather extremes.

Since the aerial array has been re-erected I have made a number of successful EME contacts. Even though I do not have elevation available there is at least an hour available for contacts at moon rise or moon set.

The winter 6m season has opened in early June and at the time of writing this I have had a number of VK contacts."

Papakura Branch 65 has been making slow progress toward getting some 2.4GHz transverter units together from some surplus commercial equipment. The unit has two PLLs driving TX and RX converters with a 70cm IF. A microcontroller to drive PLLs, CW beacon and TX / RX sequencing are being added to purpose-designed boards and conversions to some of the PLL boards have been completed with them locking at the new local oscillator frequencies. Progress is a bit slow due to having everybody there at the same time and the scribe, being team leader seems to have trouble with work getting in the way of ham radio!

Andrew ZL1WJQ working on his transverter controller.

National System link to Mercury Bay

Murray ZL1DOM reports on the new system progress for the new entry point to the National System.

Mercury Bay Branch 85 had languished in recess for several years and over the last two years there had been much talk about getting the branch out of recess. In April 2011 a meeting was held with sufficient interest gathered to get Branch 85 out of recess and make its status operational again.

A number of us, headed by Ross ZL1AAF and Leith ZL1BCJ, had often talked about getting the National System into Mercury Bay and the surrounding areas. We had a few potential sites mapped out but only one had mains power available. This site is at the end of the Opito peninsular 15km north east of Whitianga township. Mains power is a requirement of repeaters wanting to link into the National System so this clearly meant that this site was the only one worth considering.

With a decision made about the repeater site Roger McQuilkan and the boys at Whitianga Coastguard proved to be a great help in allowing us to use their maritime repeater facility at the Southern end of Opito Bay. This site had not only the advantage of mains power being available but also 4WD vehicle access all the way to the door of the building.

Easy access for servicing equipment is always a good asset to have in the long term. The site was quite modest in elevation at 160 m ASL but the antennas are mounted on a pole six metres higher.

The second decision was always going to be which National System site would provide the easiest radio path to link the site. The Branch 85

Repeater Hut at Opito Bay.

Technical advisor, Ian ZL1TAT, from Waikato VHF Group suggested that the 174 km link over water path to Mt Edgecumbe would probably be the most viable option. We organised some preliminary site investigations which confirmed that Mt Edgecumbe gave the best results even though it had a longer path than either Kaimai, Klondyke or Brynderwyn which were on the other side of some very difficult terrain.

A good strong signal was returned from Mt Edgecumbe during the evaluations which were held in some very inclement weather conditions by Ross ZL1AAF with Murray ZL1DOM assisting. Colin ZL1ACM was back at his QTH in Auckland to evaluate our transmitted signals from a 5W hand held. The inclement weather was probably a blessing as it provided us with a worst case scenario.

Everyone was quite pleased with the results and really they were a lot better than any of us anticipated. A branch meeting was held the following night to gauge support from the Branch 85 membership who unanimously decided to support the project.

We have received much help on this project from many individuals as well as groups such as the Waikato VHF group, who under the guidance of Ian ZL1TAT, provided much needed technical assistance with the FMTAG applications and delivered to us a very comprehensive engineering report. It seemed that as soon as people heard about this project, they just wanted to get in and help out in any way that they could.

Between Colin ZL1ACM, Ross ZL1AFF, Leith ZL1BCJ and Erwin ZL1TDV most of the equipment was sourced and we also had assistance from Branch 86 (Suburban Amateur Radio Club) at Musick Point and Dennis ZL1UET and many other branches and individuals. Branch 85 is also indebted to Ross Jacobs for his mast scaling abilities, which most of us had very much tried to avoid.

The repeater equipment was collected and delivered to Colin ZL1ACM for building up; for those that don't know Colin, he is highly regarded when it comes to putting electronics and repeater equipment together. Tait T345 and T346 rack mounted repeater modules were chosen through their availability, low current draw and reliability in similar installations.

At this stage the TX output will be around 11W through a 4x phased folded dipole array providing around 11.1 dBi antenna gain. The linking antenna is an anonymously donated new 12 element Yagi made by Hi Tec and pointed at 152° true.

This National System link will not only benefit local hams but also the many who visit the district during weekends and holiday periods as well as maritime mobiles who are operating in the area. From most of Whitianga township the National System should be able to be worked using nothing more than a handheld as there is a clear path to the Opito repeater site.

Branch 85 intends for this National System link to be an added resource that can be used in times of emergency along with the existing Mercury Bay (Kakatarahae) 7075 and Tairua 6975 linked 2m repeaters. The Branch has already formed a close relationship with Whitianga Coastguard and with Whitianga land-based Search and Rescue through Rob Par ZL1UCM who is their area coordinator.

The target area for this National System repeater is an approximate 60km radius from the Opito site which is on the extreme eastern end of the Opito Peninsula, coverage should be from Cape Colville in the north to around Whiritoa in the south, from higher ground this distance could very well increase but as with most UHF repeaters there is likely to be a few blind spots due to terrain within that area.

The repeater site shows a clear path to the north from the southern end of Great Barrier Island and also covers offshore islands such as Cuvier, the Mercury Islands, Shoe, Slipper and the Alderman with Mayor Island clearly visible on a fine day about 70 km to the SSE. The link path to Mt Edgecumbe is mainly over water passing just to the western side of Mayor Island and passing close to Motiti Island and then making landfall close to Maketu before travelling inland to Mt Edgecumbe.

From the Opito site Mt Edgecumbe National System was able to be worked with a handheld during the evaluations which was surprising since the summit of Mt Edgecumbe is actually well over the visible horizon.

The National System link currently has received FMTAG approval and a frequency of 434.800 MHz with a positive split has been allocated. Licences from the MED have been issued and at this stage the National System is likely to be operational in the bay by late July 2011. With antennas already in place and feed lines run it is just a matter of installing the equipment in the building and turning on the switch to conduct some initial testing.

Technical Tidbits

Vaughan ZL1TGC has been perusing recent issues of *QST* magazinewhich have contained some interesting new products which he thought might be of interest to the VHF/UHF community.

Array Solutions <www.arraysolutions.com> have an interesting range of radio accessories and test equipment. If your Bird Model 43 Wattmeter meter movement no longer works and the replacement is more than you paid for the Bird originally, have a look at their digital display upgrade kit.

Also from the same supplier is the AIM UHF antenna analyser which operates from 5kHz to 1GHz and can be used for a number of different tasks: SWR referenced to any impedance, resistance and reactance at the cable input or at the antenna terminals, will measure resistance and reactance of discrete components, give the return loss and reflection coefficient, measure cable length, cable impedance, cable loss and using the TRD function, measure distance to a cable fault (open or short circuit). Unit has a USB interface which connects to your free computer run software which displays the information from the analyser.

Mini-circuits, who many of you will know from their range of mixers and MMIC low noise amplifiers, have a series of USB powered RF power sensors which measure average signal power levels from -30dBm to +20dBm over a frequency range from 1MHz to 6GHz. Three models are available: the PWR-6G+, PWR-6GHS+ and the PWR-8GHS+. This last model has a frequency range up to 8GHz. Each RF power sensor comes with an N-to-SMA adapter, USB interface cable, the operating software on CD and a user manual. Software updates are downloadable from the Mini-Circuits website <www.minicircuits.com>. In addition to reading and displaying RF power, the software can output the data as a text file or in Excel spreadsheet format. For maximum accuracy, the frequency being measured is entered into the software display window. An internal temperature sensor compensates for temperature variations and keeps the readings accurate. *QST* Feb 2011 has a review of these sensors and discusses their use for calibrating attenuators and measuring return loss.

Times Microwave Systems have published several technical papers on the topic of lighting protection and grounding systems for wireless networks and associated radio applications. One of the papers entitled "Lightning Protection Guidelines for Equipment Connected to an Antenna Feeder Cable or Waveguide" gives a good description of the general requirements for lightning protection. The papers can be downloaded from their website <www.timesmicrowave.com>. Their website also has a useful on-line calculator for coaxial cable power handling and attenuation.

Contest Comments

Steve ZL1TPH reports; "This contest was more of an activity session and a few local QSOs with friends from home station in Orewa at sea level. Worked the regulars etc out to Taranaki on 2m, 70cm and 23cm at 300km; not far but considering Ted ZL2IP was only running 1W on 23cm TX the gear both ends is still working OK despite the rather hard path. Good contact on 70cm in Tauranga at 190km to Dave ZL1AKW with my small 2 stacked beam off the side and fixed pointing 185° true south to Egmont. On the Sunday morning for 3400 MHz when up to Moirs Hill with only a small 6 dBi waveguide feed flange to get two contacts on the band in the log to Simon ZL1SWW. First test with PLL from VK3XDK and separate OCXO

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Magazine Survey

Compiled by Grahame Fraser ZL3SJ
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Amateur Radio (WIA)

June 2011

p8 Multiband Antennas.
p11 A device holder for SMD construction.
p12 Down in the dirt: radio earths.
p15 My FT-290R repair adventure.
p22 Building and using a touch keyer.

July 2011

p10 An improvement to the hidden 40 metre X beam.
p12 Building an 80 metre magnetic loop antenna for your attic.
p15 Improvements to Jim's RF voltmeter.
p21 Review: The Icom IC-9100.
p43 Philips PRM80 six metre conversion.
p49 The 'DTMF engine'.

CQ

May 2011

p36 Inexpensive SWR Measurements (and antenna impedance meter).
p101 More Sunspot Cycle 24 History Has Been Made!

June 2011

p24 "Two Blue Lawn Chairs 20 Feet High" Antennas in the Park.
p44 An Improved VFO Driver Amp for Tube Rigs.
p52 The 555 Once Again!
p62 EmComm to the Field: In NZ 'Quake Wake, Christchurch Hams Blanket the Countryside.

QST

June 2011 Special Field Day Issue

p30 A One Person, Safe, Portable and Easy to Erect Antenna Mast.
p33 Is There an Optimum Height for an HF Antenna? (Higher isn't always the best.)
p36 SWR, Reflected Power – What Do They Mean?
p37 Direct Digital Synthesis for Those Classic Rigs (a stable and accurate VFO with digital display).
p42 A Single Element Vertical "Beam" (a vertical with only two radials).
p45 Two Small Helical Antennas for 2 Meters.
p60 Hands-On Radio #101 Rotary Encoders.

July 2011

p33 Custom Open-wire Line (drilling and cutting jigs for snap-on spreaders).
p39 Gain Twist 75 Meter Mobile Monobander.
p43 Electronic Kits Still in the Picture (includes list of kit providers).
p57 Review: The Ten-Tec 1054 Shortwave Receiver Kit (US$39 regenerative receiver).
p58 Hands-On Radio #102 Detecting RF – Part 1.
p91 The AWA Gateway (An Antique Wireless Association freebie mag at <http://www.antiquewireless.org/gateway.htm>).

Radcom

June 2011

p20 Doublet antenna at six feet above ground (practical and cheap for restricted space QRP).
p22 General Purpose PIC Controller (development board with data for voltmeter, 50 MHz frequency counter, synthesiser).
p26 Homebrew: JFET cascode i.f. amplifier, product detector and a.f. amp for the HF transceiver; dead bug style
p34 The coupled resonator multiband antenna.
p38 Design Notes: Direction finding.
p50 Current mode choke balun for the low bands.
p62 VHF/UHF: Sporadic-E propagation returns to the VHF bands.
p72 EMC: Ofcom release PLT EMC report.

SPRAT

Summer 2011 #147

p4 The GQRP Club 10 MHz SSB filter (4 crystals).
p6 ZL2BMI DSB 80m Transceiver–Correction & Update.
p8 The DCR4 Experimental Short-Wave Receiver.
p22 Simple tone-operated keyer (driven from an MP3 player loaded with Morse code.

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and TRV OK! Noticed no drift on 3400 SSB whatsoever, tested also the waveguide feed flange compared to these circular loop dish feeds the later has less gain but no doubt a broader beam width. Want to test ahead (given time) if the circular feed is better or worse than my gold standard of the waveguide feed flange with my 1.2m dish."

Simon ZL1SWW reports; "Much the same situation as Steve with a few local contacts on 2 & 70 as well as some to Dave ZL1AKW, Nick ZL1IU and Ted ZL2IP in Taranaki. Happily worked Ted at 271km on 1296 over 3 consecutive periods. Looking at the Hepburn predictions, all looked pretty bleak with New Zealand showing up as black all over, indicating that it was extremely poor without any helpful tropo ducting anywhere. Just goes to show that 1296 can still cut it under less than ideal conditions."

Andrew ZL2ALW reported that there was not a squeak of activity over the time he listened from about 6pm Saturday and all Sunday, did not get one contact. The Wellington beacon was very weak both days. From Marton, he did not hear any other beacons either, he can sometimes hear the AKL beacon on good days from his home QTH.

Then next contest will be the Brass Monkey Contest; all bands 50 MHz and up. Saturday 6 and Sunday 7 August.

2011 VHF-UHF-SHF Contest Calendar

Brass Monkey Contest. All bands 50 MHz and up. Saturday 6 and Sunday 7 August.

Microwave Contest. All bands 614 MHz and up. Saturday 1 and Sunday 2 October.

Field Day Contest. All bands 50 MHz and up. Saturday 3 and Sunday 4 December.

For all contests, the operating periods are 1700 to 2300 on the Saturday, and 0700 to 1300 on the Sunday, New Zealand local time. The complete Contest Rules are available at: <http://www.vhf.org.nz/pubs/Contests/VHF-UHF-SHF-ContestRules>

Summary

Acknowledgement and thanks; to ZL4LV, ZL1DOM, ZL1TGC and others for article input for the column.

If you have input and pictures for the columns ahead; such as DX activity reports, repeater installation, branch activities, snippets of interest, technical items etc, please send to Simon ZL1SWW <zl1sww@nzart.org.nz> or *Call Book* addresses. (I also accept large picture files sent via email).

From the VHF/UHF/SHF Contest Manager

Results of the Hibernation Contest, held on 11-12 June, 2011. Congratulations to the overall winner: Simon ZL1SWW, and to Stephen ZL1TPH, in second place. The full results, and details of the next contest, on Saturday 6 and Sunday 7 August 2011, are available at: <www.vhf.org.nz>.

AREC – Amateaur Radio Emergency Communications

Geoff Gillman ZL3QR and Bev Gillman ZL3OV

AREC Mission Statement:
To be the preferred provider of Emergency Communications to New Zealand Emergency Services.

Hi, Everyone. In this issue we again feature the 22 February earthquake, this time from the perspective of a volunteer helper from outside the area. It would be pertinent at this point to note that this column is a bit shorter than usual, the simple answer being "lack of material". This is urgently required for future issues.

Three days in Christchurch with Marlborough Search & Rescue

After a busy Sunday at work I arrived home to find emails galore from SAR asking if I was available for deployment in the shaking city. Obviously "Yes" was the answer and after hurriedly sorting out equipment was then ready for a briefing at EOC at 1800 hr. The briefing required us to be self-sufficient for 48 hours, including water, food, radios, LSAR vests, photo I/D, tent, leather boots, gloves, safety glasses, day pack and all-weather clothing. We departed the EOC at about 1900 hr, bound for Christchurch, arriving and bedding down in the Halswell Domain somewhere about 0030 hr Monday morning. Up again at 0530, showered, cooked breakfast in the back of my Toyota Surf, then all packed up and ready for deployment at 0730.

We, along with other LSAR people, were divided into 11 sectors, within which were eight teams of two. After a very thorough briefing of what we would be doing and what to look out for, we drove to our meeting point somewhere in Phillipstown/ Linwood area. On arrival and all standing around being briefed, we experienced the first of many shakes, and, yes, where we were standing happened to be right underneath power lines. NOT for long, we all hastily moved to the middle of the road. The task was mainly a welfare check of every residence, with door knocking and asking a range of questions all of which had to be documented for debriefing at the end of the day and which was then included in a database to be forwarded to Christchurch Civil Defence. This was a time consuming job and very much an eye-opener as to the residents' plight. Some areas were virtually a league of nations with people in all sorts of turmoil, physically and emotionally. This lasted all day, with a return to base camp at about 1800 hr to a hot cooked meal and refreshments, more than some people were getting. Some of the damage we came across ranged from old red brick chimneys and walls completely destroyed, to very fine sand covering up to 200mm deep in some flats, all across carpets, in cupboards, and virtually destroying everything at floor level, and in some houses the liquifaction had come up through the floor and dislodging all the floorboards throughout.

Tuesday brought our tasking to a different area; that being the heavy industrial area in Sockburn, of which, out of the 70 odd premises we visited, only one had a concrete slab some 7 metres high being dislodged about 50 mm in one corner, already taken care of by the owner, but our task was still to document everything. At 1251 all work in our vicinity stopped for two minutes, signifying exactly one week to the minute, of the 6.3 earthquake. Even the vehicles moving along the roads pulled over and the drivers exited to stand on the roadside, a poignant moment and one I will remember for ever.

Wednesday saw the two of us travel to Little River and carry out our tasking along with two other groups, this was an area with not much damage at all, but still had to be tasked. This is where ZL2RKL asked the question of rabies, after the other person with me was bitten by a dog; so off to meet the roving medic, who duly attended him then carted him off to the nearest medical centre for further treatment before depositing him back to Halswell base. After a hot meal and a few refreshments; then a visit by Mayor Bob Parker, it was time to pack up all our belongings and head for home, our task complete.

Sometime within those three days I met up with Bill ZL2AYZ and Tony ZL2RKL, who were requisitioned to Christchurch after being put on standby earlier in the week. Tony has already mentioned in interface of their activity under control of Christchurch AREC. They both did a sterling effort under the very trying conditions and circumstances. They were very lucky in their situation that the weather was fine as all the radios to be issued out every morning were laid outside in their respective cases from all over the country. There were F3s and new Tait radios, some of which the existing programming left a lot to be desired. Bill and Tony were held in very high regard in carrying out their duties and this was told to me by Christchurch AREC staff, who would have them back anytime.

Some statistics. On the Wednesday morning there were 303 troops on the ground. With this large number the tasks were being completed at a rapid rate, in less than three days, when the expectation (by Civil Defence) was more like a couple of weeks. Some of the areas were badly affected, and the ambulance had to be called on several occasions. One person had not eaten in five days and needed urgent attention. There is no doubt that our tasking was a very important one. A problem arose where our team were completing the job before the EOC could give them another one. On a lighter side, there were a few interesting stories that came out of this operation, some around the lower social economic areas with cars pulling up outside a certain house and some quick purchases being made (we by-passed those houses). Another amusing moment, was the country boy from Owaka who knocked on the door of a residential property. A deep male voice was heard to ask "Who is it?" When this was explained, the door was opened and there appeared an aged and tattooed transvestite wearing a nice little see-thru number. "Hallo, Sir" (oops) said the man from Owaka … then he pondered whether 'Sir' was the right term. The "lady" was described as rather less than attractive but was not in need of any assistance. On to the next house went the man from Owaka.

Some lighter statistics

- There were 55 730 homes checked, 12 462 total man-hours of New Zealand Land SAR.
- Average 63% occupancy rate.
- 30% of homes visited sustained minor damage.
- 20% of homes visited sustained moderate damage.
- 10% of homes visited sustained major damage.

This was from Wednesday 23 February to 1 March.

Operation West grew hugely with 350 Landsar volunteers on the scene, being tasked in three divisions around the city. The IMT were only expecting around 200 persons as a base number, but the larger numbers arriving proved a challenge. There were personel from Whangarei to Stewart Island, an excellent response and a great gathering of SAR people.

Paul Rennie
ZL2RE / ZK8EO
(A Section Leader multi-tasking with Marlborough SAR)

Activity Briefs

(A selection from May/June)

1/05/11. Manakau Branch 21. Sports & Training. CLEVEDON/ CLEVEDON Cycle for Life Event, 107km around Hunua Ranges, in partnership with Howick Lions. 5 ops using 147.075 repeater for safety comms. 800 riders started, a difficult day for them due to gale force winds. There were a few incidents (cramp, dehydration, exhaustion). We had three fixed stations and one mobile with the Ambulance team. Signals back from repeater were weaker then normal and we had problems in the Hunua Valley; possibly due to the damp conditions and previous heavy rain in the Coromandel Ranges at the repeater site.

5/05/11. Tauranga ECG Branch 88. Tauranga City Police Station. Debrief from USAR teams from Christchurch. Talk and photos presented by USAR team members after returning from Christchurch earthquake event.

6/05/11. Horowhenua Branch 16. SAR. Otaki Forks. Experienced SAR member and his small dog reported overdue from laying a trail for a future SAR exercise. Was well-equipped with Locator beacon and Spot-Me device. Ten SAR teams, RNZAF Iroquois and other rescue helicopters assisted.

▶ *continued on page 26*

DX Downunder

Graeme Hunt ZL1ANH and ZL1T
<graemeh@xtra.co.nz>

With his 7 element beam and 2 kW, Chris TL0A is one of the strongest Africans heard on 20m in ZL.

Conditions over the last few months have certainly been changeable; during the last week of May the Solar Flux Index (SFI) plunged to 75, down from a high of 150, and now in June is back to 100. Of course the SFI isn't the only measure, the sun's activity has also included Coronial Mass Ejections (CME) and X-rays. There have been auroras and some radio blackouts. The blackouts have been fairly minimal at the R1 and G2 level. R1 is defined by NOAA as weak or minor degradation of HF radio communications on the sunlit side of Earth, with occasional loss of radio contact. G2 is defined as fading HF radio propagation at higher latitudes plus auroras. There is an excellent article by W1ZR in the July 2011 *QST* magazine setting out all the factors affecting the ionosphere.

For May and June, including the CQWW CW WPX contest, conditions have been marginal from 80m through 10m. It's June, and tonight is fairly typical of recent band conditions, just a few VK/ZLs on 80 and 40m, nothing else. There were openings early today into the US and North Africa on 15m and some VKs on 6m were coming through during the day.

It's difficult to comprehend this when the SFI is 100 and there are eight sunspots visible. Predictions were that the solar flux index would rise over the next two years, but the recent drop back to a SFI of 75 isn't great. Some scientists, current predictions are quite negative with a decline now forecast and a very weak cycle 25 peaking around 2023.

DX operations over the last months included J2, Djibouti, 6W Senegal and J5 Guinea Bissau. TL0A has been booming in from Central African Republic before dusk on 20m. Although a difficult part of the world to work, his 7 element beam on 6 bands and power of 2 kW certainly do the job.

I did not manage to work the Trindade operator Junior, signing PP0T. Trindade is off the coast of Brazil, not to be confused with Trinidad 9Y, which is often heard on the bands. Trindade is a military base and operating times depend on availability of the military radio, so ham radio is taking second

◂ *continued from page 25*

He and his dog were winched out by the RNZAF, both tired, but in good health.

7/05/11. Western Suburbs Branch 03. Sports & Training. Hampton Downs and Raglan. New Zealand Rally Championship, Round 3. Two operators assisted with Rally New Zealand Radio Communication Radio. This involved the start of the rally, re-groups and service at Hampton Downs racing Circuit and finish. Ross then travelled to Raglan Airfield where there was a refuel. Re-group and service before returning for finish and presentation at Hampton Downs.

8/05/11. Tauranga ECG Branch 88. SAR. Suburb of Tauranga Pyes Pa. Search for missing 85 year old male dementia person. Missing person located before teams left Tauranga South Police Station.

15/05/11. East Southland Branch 08. SAR Training. Kaiwera Downs Station. Search and Rescue Exercise. Three search teams were dispatched to find "missing" hunter. Comms were established using SAR repeater and X-band repeater. Missing party and search parties had to be pulled out early as an idiot with a gun was wandering around in the area, uninvited. "Missing" person and teams were relocated to another site on the farm resulting in a brief search.

16/05/11. Eastern BOP Branch 51. SAR. Waioeka. PLB alert in Waioeka area. Heavy rain and cloud so helicopters could not be used. Teams in at 21:00 but with flooded rivers they were stood down when father of injured hunter made his way out saying that injured party was OK for night. Injured party was winched out by Taupo Rescue helicopter at 8.00 next morning.

26/05/11. Eastern BOP Branch 51. SAR . Te Kaha, East Cape. Overdue hunter with diabetes and who had no medicine with him. Stopped on way to event at Opotiki as lost party had made his way out.

27/05/11. Wairarapa Branch 46. Sports & Training. Rally Wairarapa. Provide comms for safety and results for car rally held over two days with 17 stages run, 61 cars started event and about 40 finished.

3/06/11. Otago Branch 30. SAR. Tomahawk, Dunedin. Search for a mentally ill 62 year old male. Communications were provided to search teams via ESB 58, the POLSAR portable repeater, which was set-up on the Otago Peninsula over looking the search area. Teams searched Tomahawk and Smails beach and cliffs over looking the beaches with some of the missing person's property being found on the cliffs. The missing person was not located, but some blood was found by abseilers.

10/06/11. Otago Branch 30. SAR Training. Dunedin City. Took part in the annual Land Search and Rescue Awareness/Collection Day. An opportunity to raise the profile of the Dunedin Group and raise some funds for training equipment.

18/06/11. Auckland VHF Group Branch 66. CD Training. Auckland Civil Defence Headquarters, Pitt Street, Auckland City. Branch 66 AREC Section meeting. Due to location and nature of talk, all sections in Auckland were invited to attend. 15 people attended the meeting. An outline was given on how the communication system would work in an emergency and we were made familiar with the area so that we would know what to expect if called in. A draft Auckland CDEM Communications Plan was also presented.

25/06/11. Eastern BOP Branch 51. Sports & Training. Whakatane, Ohope. A triathlon event with cycle, run and canoe stages. 300 plus entries. Comms and marshalling done by AREC and Landsar. No problems this year despite the wet conditions.

Conclusion

Thanks to those who have contributed to this issue. Material for the next one to please be in our hands by 3 September. Photos, if included, preferably on a separate CD (with captions) mailed directly to us. E-mail pix may be acceptable but will be at the Editor's discretion and must not be embedded in the text.

Contact details: <zl3qr@nzart.org.nz> or <zl3ov@nzart.org.nz> or post to 6 Boyd Street, Rangiora 7400, or phone (03) 313 7137.

Reminder

The next Section Leaders' Nets should be 15 August and 19 September, 3900 kHz USB at 1930 hrs unless notified otherwise.

Until next issue, 73,

Geoff ZL3QR & Bev ZL3OV

place. I've heard him once on 15m SSB but he was weak. He was also spotted on 20m PSK31 when there should have been propagation, but I couldn't see his trace. As usual there was constant criticism on the spotting nets, I wonder if any of these people have ever got out of their comfortable chairs and put a remote DX station on the air.

Power

In the past few columns I've looked at radios, antennas and modes; this time it's power. A common question is "How much power do I need to work DX?" That's rather like asking how fast should I run to get away from a grizzly bear. The answer is pretty much the same, you only have to run faster than your companions, not faster than the bear. Likewise you only have to be powerful enough to be heard above the noise and weaker stations, and remember, conditions change and the DX will hear you better at different times of the day.

It is important to consider the relationship of dB to power change. Doubling your power brings an increase of 3dB. (dB= 10 log (2), which is 3.01) To be one s-point stronger, nominally 6dB, you need to double, then redouble your power – ie to get a 6dB increase from 100W transmitter, double power to 200W and double that to 400W – four times the power for each extra s-point. As an example, if your signal with your 100W is being received at S4, to increase to S7 (18dB increase) your power will need to be raised to a massive 6400W.

A three element Yagi will have a forward gain of around 7dB.

Another way to look at the decibel is that 1dB is the amount teenagers turn the "music" down, and not until after a huge argument.

The Radiocommunications Act 1989 and subsequent regulations and notices are summarised on the Ministry of Economical Development website as follows:

"Except as provided to the contrary in this notice, transmitter power output must not exceed 500 watts peak envelope power (pX), as defined in ITU Radio Regulation 1.157."

See below for their website which has most of the amateur rules clearly set out. Although the Ministry's website doesn't include it in their glossaries, pX is another abbreviation for PEP.

At the NZART 2011 Conference, a remit was passed asking that NZART negotiate with Radio Spectrum Management to increase amateur transmitting power to 1000W PEP. Note that this is only at the negotiation stage. I'll update you if it becomes law.

Peak Envelope Power (PEP) is the average power supplied to the antenna transmission line during one RF cycle. As a rough guide your PEP will be about twice what your power meter or final ammeter is showing (times final plate voltage), during SSB and CW morse, and fairly close to the power indicated with CW key down, or when using RTTY.

Many prefer to run a linear amplifier and back the drive off, so that the PEP limit is not exceeded, rather that operate their transceiver at maximum output. If you are contemplating a linear amplifier consider:

1. Will your antenna and coax take the power, what are your antenna traps rated at?
2. Will all relays or switches in your antenna or transmission lines take the power?
3. If you are using a tuner, is it rated for high power?
4. If you are already causing TVI or other interference, more power will make it worse.

Linear amplifiers are not to be trifled with as they contain lethal voltages, so keep out of the box if you don't know what you are doing.

Many of the older linears use switching voltages on their relays that will fry your modern transceiver. My Yaesu transceiver is rated to switch 60 VDC at 200 mA, well below what many older linears use.

An external relay or a PNP transistor like the MPSA92 can be used to switch older linears.

At the other end of the power scale, there are the QRPers. The focus is low power, 5 watts being common, and some impressive DX is obtained. Here the antenna is the decider, as 12dB from a larger, or stacked array, is possible. So remembering our formula, that's the same as increasing the power by doubling the power 4 times – 80W compared to 5W from a dipole. (Yes, I know, isotropic radiator.)

I feel that one reason that some QRP stations get through is they tag QRP on their call-sign like JA7XXX/QRP and are still transmitting long after the rest of the callers have finished. I am not sure why it is so important to tack QRP on after their call-sign. It is their prerogative to run low power and there is no requirement, as far as I know in any award, to mention QRP along with the call-sign.

This month I have worked two stations in the USA on 15m SSB, both were running about 80W and both had antenna restrictions and were using wire antennas inside their roof. Now I take my hat off to those guys.

DXpeditioners wanted for KH8A, American Samoa: Ever wanted to operate from a sought after location? This is your chance. They are looking for operators from 17-20 November. View details at <www.k8a2011.com>

New DX Net in Pacific running Monday, Wednesday and Friday at 0600 on 14 265 kHz. This is a little different as you need to register on line as a member. For details go to <http://pacific-dxers.com>.

Ultimate DX? NASA is still communicating with the Voyager spacecraft which currently is 10 billion miles distant, in fact it has left our solar system. Signals are taking 16 hours each way.

Q codes. To celebrate and update 100 years of the Q Code here are some further suggestions:

QBB My transceiver is a black box from Japan, I haven't a clue what's inside it, nor what most of the switches on the front are for.

QPL I can't copy you because of my high local noise level, standby while I go next door and throw a brick through my neighbour's plasma TV.

DXpeditions

Afghanistan; T6MO for next 12 months.
Ascension Is; ZD8D
24 July – 9 August
Benin; TY1KS 5-14 August see <http://www.dxcoffee.com/ty1ks>
Micronesia; V63AA
26 July – 4 August
Easter Is; E0Y 30 July – 8 August
American Samoa; KH8?
30 July – 14 August
Market Reef; OJ0UR
13 – 20 August
Rotuma; 3D2CJ September
Svalbard; JW9DFA
14 – 19 September
Timor Leste; 4W6A
16 – 26 September
Conway Reef; 3D2CR
1 – 6 October
Papua New Guinea; P29CW
August
Gough Is; ZD9GI August
Democratic Rep of Congo; 9Q6CC until November
Southern Sudan; new country, watch this space.
Southern Cooks; E51AAO, look for Bruce ZL1AAO from 19 – 28 August.

ZL special calls

Calls ending in RWC are for the Rugby World Cup, as is ZM2KBR.

ZL100IBM is commemorating the 100th anniversary of the IBM Company.

ANZA Net

Daily DX net at 0515z on 14183 kHz and now also Saturdays 0445z on 21205 kHz.

What's on the air now? <www.dxsummit.fi/DxSpots.aspx>

Announced operations: <www.ng3k.com/Misc/adxo.html>

QSL information: <www.qrz.com>

Sunspots: <www.solarcycle24.com/>

Acknowledgements:

OPDX, 425 DX News, NOAA Space Weather (National Oceanic and Atmospheric Administration). Ministry Of Economic Development Website for radio amateurs: <http://www.rsm.govt.nz/cms/licensees/types-of-licence/general-user-licences/amateur-radio-operators>

Contact me at *Call Book* address or by email at <graemeh@xtra.co.nz>.

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Contests

Contest Manager: Frank Hunt ZL2BR
<zl2br@ihug.co.nz>

Sangster Shield 2011; Report and Results

Many thanks once again to Glenn ZL2KZ for managing this contest. Thanks to all who took part this year. Numbers were well down but logs were received from 11 operators.

Congratulations to Barry ZL2LN (Motueka) in winning the Sangster Shield first time after a couple of years as runner up. Barry also takes the Arthur Stevens Trophy as top South Island Station. Let's call this an historic first! Records available to me (including the NZART History publication) do not show any SI station as a Shield winner. Thanks Barry for achieving this distinction.

There was a dead heat for second equal between Bill ZL2AYZ and Mike ZL2AUA. This is the first time I have seen equal scores among the Certificate entries. I have allocated fourth to myself which I think meets dead heat rules.

With only three South Island logs this year Bill ZL2AYZ and Gilbert ZL3UJZ take the Arthur Stevens second and third places behind Barry ZL2LN. This means that South Island stations fill both first and second places in the Shield. More history made this year.

There is no qualifying Branch with three entrants so no Branch Award this year, also there were no newly licensed entrants for the Transistor Trophy. The 11 qualifying active Branches were: 3, 22, 24, 28, 29, 35, 50, 56, 72, 84, 88. Although activity was very low for some operators they were in Branches with other stations and I have not deducted any Branch claims.

The toughest Branches to work were South Otago (35) and Christchurch West (56) – with Gilbert's 2W. These stations recorded contacts over several operating periods and all Shield certificate holders worked both.

VKs made up the numbers. Ken's (ZL2AIH) check log took the lead with 6 VKs on Saturday but just one on Sunday.

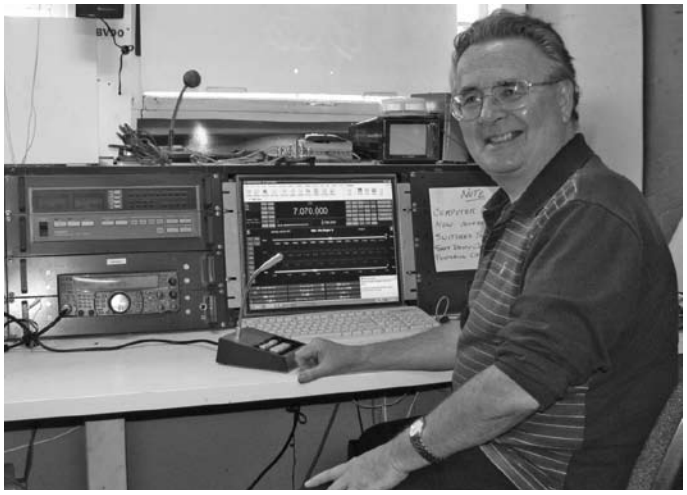
Strange how over half the entrants, including myself, failed to score ZL1BVB as over 5W. Based on consensus from logs and fairness, I have assumed that /99 was sent for all contacts and I have rescored all 5 point claims.

Comments received:-

- Reasonable conditions but not very many on.
- A very quiet Contest. Why?
- Could there be greater promotion in future? Suggesting reminder in *Break-In, Info Line,* Official broadcast. *I agree – this year has been a wake-up call–2KZ.*
- ZL3UJZ did jolly well to get up as far as Kerikeri (northern-most station) with only 2 watts. WVKs were coming in like gangbusters making up the numbers on Saturday, but not a peep out of them on Sunday.
- Lack of contacts caused many to abandon the contest leaving just seven of us on in the last hour.
- Great sportsmanship again among the hardy few.
- From the South: Did anybody else hear the seemingly random dits and dahs from an unknown operator during the contest? *I certainly did in Wellington and returned "QSD" to no avail. – 2KZ.*

Next deadline for copy is
10 September

Amateur of the Year 2010
David Searle ZL3DWS



Christchurch West Amateur Radio Club, NZART Branch 56, nominated David Searle for Amateur of the Year as he has been an active member of the branch for over 10 years as an enthusiastic promoter of amateur radio.

David has been particularly active in taking amateur radio to the wider public with a special focus on introducing radio and electronics to young people. He has achieved this by means of a series of Buildathons which have been strongly supported by members of local NZART branches (namely 05, 56, 68 and CARDS). He has received considerable financial support for these activities from local NZART branches, the Christchurch Branch of NZ Vintage Radio Society, the NZART Radio Science Education Trust Inc, the Community Board of Christchurch City Council and several local businesses.

These Buildathons have generated useful publicity for amateur radio in the local press, in RSGB's RadCom and was included in an RSGB promotional DVD. Local MP Nicky Wagner has been strongly supportive and been present at several of these events. The Buildathons have been fully reported in *Break-In*.

A report of these activities was presented to the recent IARU Region 3 Conference and was favourably received. David also served on the organising committee for this conference, being tasked with organising the Conference local office setup.

In addition David has been strongly supported by his wife Mary and family who have organised the catering for each Buildathon.

David was also involved with the 2006 NZART Conference, held in Christchurch. He assisted the organising committee and served as Master of Ceremonies at the opening and other events.

International HF Contest Calendar for August/September 2011

Contest	Dates	Times (UTC)	Website
WAE (Worked All Europe) CW Contest	Aug 13/14	0000 UTC Sat – 2400 UTC Sun	<www.darc.de/referate/dx/contest/waedc/en/rules/>
SARTG (Scandinavian) RTTY Contest	Aug 20/21	0000-0800, 1600-2400 & 0800-1600 UTC	<www.sartg.com/contest/wwrules.htm>
SCC (Slovenian) RTTY Contest	Aug 27/28	1200 UTC Sat – 1200 UTC Sun	lea.hamradio.si/~scc/rtty/htmlrules.htm>
All Asian SSB Contest	Sep 3/4	0000 UTC Sat – 2400 UTC Sun	<www.jarl.or.jp/English/4_Library/A-4-3_Contests/2010AA_Rule.htm>
WAE (Worked All Europe) SSB Contest	Sep 10/11	0000 UTC Sat – 2400 UTC Sun	<www.darc.de/referate/dx/contest/waedc/en/rules/>
SAC (Scandinavian Activity Contest)	Sep 17/18	1200 Sat – 1200 UTC Sun	<www.sactest.net/#tabs-6>
CQ WW RTTY Contest	Sep 24/25	0000 UTC Sat – 2400 UTC Sun	<www.cqwpxrtty.com>

2011 Jock White Field Day Results

Call-sign		80 metres					40 metres					Tot Mult	Total Score	Pwr Out	Branch
		QSOs			Branches		QSOs			Branches					
		Ph	CW	DX	Ph	CW	Ph	CW	DX	Ph	CW				
Montgomery Cup - Northern Region															
1	ZL1AA	391	257	5	33	16	308	43	23	25	10	84	0	100	02 Auckland
2	ZL1AM	400	232	5	33	16	212	132	6	23	12	84	0	100	28 Whangarei
3	ZL1UX	316	148	2	29	13	187	94	6	25	12	79	0	100	12 Hamilton
4	ZL1TEC	247	29	1	31	10	168	32	6	25	10	76	0	95	88 Tauranga Emergency
Patea Trophy - Central Region															
1	ZL2QF	493	214	7	34	16	277	141	27	26	12	88	0	100	87 South Taranaki
2	ZL2AB	367	200	7	33	16	211	113	9	26	13	88	0	100	27 New Plymouth
3	ZL2KO	403	163	1	32	15	269	123	9	26	12	85	0	100	20 Manawatu
ZL3/4 Trophy - Midland Region															
1	ZL2KS	337	162	7	33	15	216	64	15	25	12	85	0	100	22 Marlborough
"4" Trophy - Southern Region															
1	ZL4AL	243		24	32		349		47	26			0	100	08 Eastern Southland
2	ZL4AA	153	40	2	30	11	94	50	8	25	11	77	0	100	30 Otago
3	ZL4GQ	196		1	24		170		7	24		48	0	100	37 Southland
Single Station: 80 and 40 metres															
1	ZL2GT	393	202	3	32	16	224	79	17	25	12	85	0	100	25 Napier
2	ZL2OA	136	84		30	12	171	76	5	26	12	80	0	100	46 Wairarapa
3	ZL1KDX	391		3	33		197		12	24		57	0	90	33 Rotorua
4	ZL2VH	50			24		44		1	21		45	0	100	63 Upper Hutt
W M Hall Memorial - QRP															
1	ZL1LC	286		1	28		121		4	23		51	0	5	58 Helensville
2	ZL4TCA	106			25		117		2	22		47	0	5	64 North Otago
Single operator															
1	ZL3AKM	199	57	4	33	13	273	55	15	26	12	84	0	100	01 Ashburton
2	ZL1HP	416		4	30							30	0	100	04 Cambridge
3	ZL1QB	240		1	30		122		2	21		51	0	100	21 Manukau
CW only															
1	ZL1CB		109			15		40			12	27	0	60	40 Te Awamutu
80 m only															
1	ZL50VK	421	234	5	33	16						49	0	100	65 Papakura
2	ZL2PT	386	168	1	33	15						48	0	100	19 Inglewood
3	ZL1AC	302	168		30	13						43	0	100	03 Western Suburbs
4	ZL1WT	61		2	24							24	0	60	40 Te Awamutu
Hastings Trophy; phone only															
1	ZL1SA	437		10	34		311		19	26		60	0	100	10 Franklin
2	ZL1CCT	462		2	33		245		17	23		56	0	100	83 Ragaln
3	ZL2AMS	346		4	34		213		9	25		59	0	100	23 Marton
4	ZL1REG	291		3	32		245		13	25		57	0	100	81 Waikato VHF Group
5	ZL2HV	183		4	35		135		17	23		58	0	100	18 Lower Hutt
6	ZL1ZLD	366		4	32		43			14		46	0	100	86 Suburban ARC
7	ZL2AFV	489		9	34							34	0	100	42 Titahi Bay
Overseas section															
1	VK2HBG	30			19		120			26		45	0	100	
2	VK5FPAS	8			8		17			12		20	0	10	
Home stations															
1	ZL2JKY	266	138	3	33	16	114	62		27	12	88	0	70	
2	ZL1DK	271	78	4	33	10	156	43	14	26	11	80	0	100	
3	ZL2AUA	210	110	2	31	13						44	0	100	
4	ZL2AVL		105			18		55			12	30	0	5	
5	ZL1BWG		97			15		79			12	27	0	100	
6	ZL3DM	177		2	32							32	0	100	

Break-In 50 Years Ago

Craig Crawford ZL3TLB

***Break-In* August 1961**

Christchurch Branch visits NZBC TV Channel 3

During the week prior to the commencement of TV transmissions in Christchurch the local branch was taken on a conducted tour of the installation.

The studio equipment is located in the 3YA building with the transmitter in a newly erected building alongside. A sound studio and control room have been joined together to make a new television studio in which all live performances take place. In the studio are two cameras, microphones, scenery, backdrops, etc. From a lighting console, which contains several dimmers, power is fed to any combination of lights through outlets contained in the ceiling of the studio. Lights range from 100 watt spotlights to 1.5 kilowatt floodlights.

Transmissions commence at 6.50 each evening with a test card viewed through one of the studio cameras. A camera consists of two basic units, the camera itself in the studio and the control unit located in the control room. The camera operator composes the picture in his viewfinder, which is a small picture tube, adjusts the optical focus and selects the lens to be used at the instruction of the programme director. The camera tube, a 4.5 inch image orthicon has a comparatively short life of 500 to 600 hours.

In the control room the signal from the camera is processed by the technician at the camera control unit. He is responsible for the adjustment of exposure, contrast and brilliance, a job which keeps him fully occupied while that particular camera is in use. At approximately weekly intervals the complete camera is re-aligned. This is a job which occupies a minimum of half an hour and requires the manipulation of a vast number of small knobs on the control unit.

Following the test card the channel identification is shown until the programme commences at 7pm. The identification chart is taken from a 35mm slide in the Telecine room. The Telecine room contains two Bell & Howell 16mm movie projectors and two automatic 35mm slide projectors. The light from all of these projectors shines into one vidicon camera through a combination of mirrors and prisms, known as an optical multiplexer. During normal transmissions two people are occupied in this room, one handling the threading of projectors etc. and the other operating a camera control unit.

Signals from all the sources mentioned are now fed onto the vision mixer. Behind the vision mixer are several picture monitors, one showing the picture being fed out to the transmitter and other monitors show each camera source. On the instructions of the programme director the technician beside him selects the programme source required. The change over from one signal to another can be handled in many ways. They may be faded through black, dissolved from one to another, or just directly switched. The programme source is selected by the buttons on the left side of the panel and fading is controlled by two levers in the centre of the panel.

To the left of the control room are the synchronising and waveform generators, and the audio desk. This contains two turntables and an audio tape recorder. One sound technician controls the sound from the studio microphones, the turntables, the projectors, etc all at the same time.

Signals from the vision mixer and the sound mixer are now fed out to the transmitter building. This houses two transmitters, a 1kW FM sound transmitter and a 5kW vision transmitter. Behind the transmitters is to be found a plumber's delight. This combines the outputs of the two transmitters into one common feedline up to the aerial. This combining unit also contains a vestigial sideband filter for the vision transmitter.

The coaxial feeder from the combining unit to the aerial contains nitrogen gas under pressure. This serves to eliminate moisture and thus minimise corrosion effects. The aerial is mounted at the top of the 150 foot mast on the 3YA building. The antenna consists of a system of folded unipoles and has an effective horizontal gain of two, giving an effected radiated power of 2kW sound and 10kW vision.

◂ *continued from page 29*

Sangster Shield Results 2011

Sangster Shield – open section										
Place	Station	Name	0-5W	6+W	DX	Bchs	Pwr	Total	Br	Equipment
1	ZL2LN	Barry Davenport	102	2	4	10	5w	5520	24	Yaesu FT847, 80/40 Trapped dipole
2=	ZL2AUA	Mike Burch	98	2	4	10	5w	5320	42	Icom 735, Balanced Windom, Straight key
2=	ZL2AYZ	Bill Cousins	98	2	4	10	5w	5320	22	Icom IC-706, 80m C/F Dipole
4	ZL2KZ	Glenn Kingston	100	2	2	10	5w	5220	50	H/Brew valve xcvr, BLY87A final, λ/2 dipole
5	ZL2BIF	Sid McKain	89	1	2	9	5w	4194	72	Yaesu 890/ K'w'd 820, Sky-wire loop 136m
6	ZL2AQL	Mike Spearman	82	2	1	9	5w	3798	88	Yaesu FT101Z, FTC-902 Tuner, dipole ant.
7	ZL1WI	Roy Milam	89	2	1	7	5w	3199	3	FT767, Sloping dipole
8	ZL1BWG	Bruce Scahill	77	1	0	8	5w	3088	28	Yaesu FT817, 80/10 G5RV, Marconi 365B key
9	ZL2ALJ	Tony Fletcher	42	1	0	10	5w	2110	50	TS120, End-fed wire antenna
10	ZL3UJZ	Gilbert Best	20	1	0	6	5w	606	56	SW80 Kitset xcvr, Inv Vee 12' up. straight key
Transistor Trophy (Op licensed less than 1 year) – None this year.										
Arthur Stevens South Island Trophy										
1	ZL2LN	Barry Davenport	102	2	4	10	5w	5520	24	Yaesu FT847, 80/40 Trapped dipole
2	ZL2AYZ	Bill Cousins	98	2	4	10	5w	5320	22	Icom IC-706, 80m C/F dipole
3	ZL3UJZ	Gilbert Best	20	1	0	6	5w	606	56	SW80 Kitset xcvr, Inv Vee 12' up. straight key
Check log										
	ZL1AIH	Ken	With thanks				5w		29	Elecraft K2, 80m λ/4 vertical

Digital Modes

Murray Greenman ZL1BPU
<zl1bpu@nzart.org.nz>

I recently decided to do an inventory of the equipment in my shack and workshop. I limited myself to major items of test equipment and radio gear. Eventually I hope to have a complete catalogue, with photos, serial numbers, dates of manufacture and information about the manuals etc, which will help my failing brain, be helpful for insurance and also for my executors. However, I can see that it will probably take me many years to complete the catalogue, as I have discovered that I have over 120 items! The list includes 18 receivers and 15 transceivers of one sort or another. You might well ask how I can use all these with just one pair of ears!

New version of MultiPSK

There is a new version of this widely used program by Patrick F6CTE[1]. While there are a few interesting additions, for example ALE, ACARS, GMDSS and DGPS data decoders, there are no great new Amateur modes. I found the addition of a decoder for Coquelet most interesting, as this is definitely a first (but unfortunately there is no transmit capability).

While MultiPSK is very full of features, and has by far the widest range of modes of any of the multi-mode programs, I find it confusing and difficult to use. It has far too many buttons on the main screen. It would be much easier to use if arranged with drop-down menus in the manner of more visually appealing software such as FLDIGI or DM780. Even hiding the buttons not used in each main category of modes would be an improvement.

Coquelet and DominoEX

As you may have read somewhere (no, WIKI and GOOGLE aren't any help!), the Coquelet MFSK mode was developed in the 1950s by Belgian company ACEC for diplomatic traffic. It is still in limited use today, mostly in North Africa. Coquelet has some similarity to Piccolo, the UK MFSK equivalent, now no longer used. Coquelet was originally an electromechanical system, which used two groups of tones, one group of four, the other group of eight, so one of each were sent alternately. Each ITA2 (RTTY) 5-bit character was mapped to a pair of sequential tones. The system operated at a low baud rate, but since only two symbols were required per character, it was able to send 75 bps RTTY at only 10 symbol pairs per second (20 baud). Because of the high-tone/low-tone nature of the transmission, character synchronization was easily recovered by a simple frequency discriminator.

The tone generators and decoders in Coquelet equipment were interesting. A system of vibrating reeds, not unlike the reeds in a child's music box, provided the audio filters. The reeds were excited mechanically and their oscillating tone recovered by a coil (in the transmitter), or their movement excited by a coil (in the receiver). The same reeds (high and low tone sets) were switched between the transmitter and the receiver. In the receiver, the energy from the receiver audio would set the reeds vibrating, only one reed would respond to each tone, and by the end of each symbol period the amplitude would be enough to cause a reed to touch a contact. This completed a circuit activating a solenoid in the teleprinter selector mechanism.

The most impressive feature of Coquelet was its ability to handle multi-path propagation. While obviously much of this was due to the relatively low symbol rate. The sensitivity of the design gave high fade margins and good noise rejection, as a result of the long symbol integration time and relatively narrow bandwidths. Low symbol rates also reduce multi-path timing errors. There was however much more to the design than meets the eye. Because of the hi-tone/low-tone arrangement, and quite unlike RTTY, there was a complete absence of inter-symbol interference caused by different path times or ionosphere-induced Doppler. Many RTTY signals, even those which are quite strong, are completely unprintable due to this problem.

Figure 1. The NBTV receiver software in Windows 7 colours.

Piccolo (developed for the UK Diplomatic Service) was an all-electronic system, using LC oscillators which were started or quenched to generate tones. The same oscillators acted as receiver detectors. In receive mode the oscillator gain was reduced until the oscillation just stopped,. The receiver audio was greatly amplified by the set of oscillators each operating as a Q-multiplied selective filter, one for each tone received.

It was a study of the Coquelet mode and the theory of integrate-and dump detectors (an excellent paper on this was written by the Piccolo developers), which encouraged me to develop DominoEX[2]. DominoEX is significantly more sophisticated than either Coquelet or Piccolo. It has software DSP rather than mechanical or LC filters, one set of 18 tones used in a rotating pattern, and is ASCII-based with two complete character sets, rather than using ITA2. From Coquelet it inherits the use of (mostly) two symbols per character, and uses low baud rate integrate-and-dump narrow-band detectors (although based on FFT). Although DominoEX uses only one set of tones rather than two (which saves a lot of bandwidth), it also uses differential encoding and a simple tone management scheme to avoid sending nearby tones one after the other, thus retaining high inter-symbol interference performance. Sync is also encoded in the frequency shifts and easily recovered. If you've not experienced a DominoEX QSO on 80m or 40m, you really should give it a try. In addition to being fast and easy to tune, it knocks RTTY and PSK31 for a six, and the low error rate is impressive for a mode without error correction.

Analogue NBTV and Windows 7™

The Windows 7 operating system has introduced significant changes to the sound resources, and among other things, the changes affect the way sound sources are routed to and from the application programs. In general the changes are for the better, as there is more flexibility in sharing of sound resources, but you have to learn a new way of setting up the resources you need, and there is no longer a way to receive your own transmissions internally for test purposes.

When a new computer operating system comes along, it is quite common for application software written for previous versions to give trouble. In the case of the ZL2AFP NBTV software, Window 7 has necessitated a recompilation of the program to allow the receiver to work correctly. By the time you read this it is hoped that new versions of the programs will have been released[3]. I have already been testing the new 48x48 OFDM NBTV version.

continued on page 32

continued from page 31

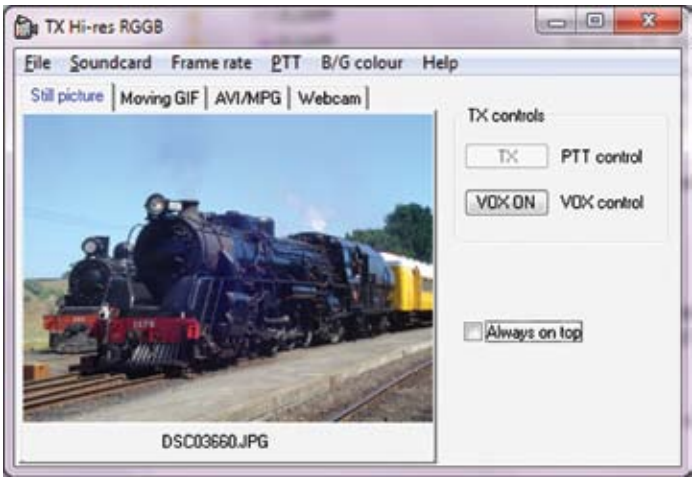


Figure 2. The VHF high resolution NBTV transmitter sending a slide show.

There seems to be very little awareness of the capability of the ZL2AFP OFDM TV system. (OFDM means orthogonal frequency division multiplex). It is pretty clever stuff! All you need to operate it is a conventional digital modes or SSTV setup. There are modes suited to low and high HF bands and a special VHF version.

While the pictures are relatively low resolution, say compared with SSTV, the fact that you can transmit one frame per second (almost moving pictures), and record and play back movie files makes this an impressive system. Colour pictures take about three seconds per frame, still considerably faster than SSTV. There is a higher resolution system, which sends each colour frame in nine seconds, and a specialized VHF FM system (no tuning difficulties), capable of transmitting high-resolution colour frames in six seconds, using a colour-differencing method.

Unlike SSTV, which is a slide-show system, one frame per over, NBTV is a sequential multi-frame system, just like slow TV or a movie. SSTV started this way in the 1950s, but when computers came along it lost this sequential frame capability which only NBTV now offers.

The OFDM TV system uses multiple closely spaced carriers, one per picture line, and very narrow FSK modulation, in a bandwidth of 2.1kHz. There is no synchronizing system needed, which makes it very robust. While tuning needs to be done with care, especially for colour images, the system was designed for HF use (it goes great on 80m) and the software is reasonably easy to use. You can send a slide show, by dragging and dropping, send a movie file, or live pictures direct from a conventional camera or a USB webcam.

Active Ionosphere

As you are all no doubt aware, the sun is beginning to wake from its long period of inactivity, and with the increase in activity we see an increase in the solar wind of charged particles, and so an increased level of ionisation in the upper atmosphere. The higher HF bands are slowly becoming useful again, much to our great joy! It's not just that the ionosphere is again working, but it is also more active in a dynamic sense.

Using low power propagation tests stations such as the MEPT transmitters I harp on about, we now have the ability to capture the dynamic effects that might otherwise not be noticed, and were rarely recognised during previous sunspot peaks. My 30m MEPT is usually in skip to ZL2IK up in Ruatangata (Northland), so doesn't show on his 'grabber'[4], but I like to keep a watch on it, because every now and again my signal rises up out of the murk in a most amazing way, sometimes for just a few seconds, sometimes for an hour or more. Peter runs a 10 minute grabber and a four hour one which makes spotting the shorter openings easy.

David VK2DDI operates a frequency agile 'grabber' which spends most of its time on 30m[5]. He sent me the next picture when he spotted some really strange propagation. It shows my MEPT signal as you've seen before, but it seems to be very blurred–received twice at slightly different frequencies.

This is probably an example of F-layer propagation where the rays of different polarization refract at two different heights. This in turn happens because the charged atoms have their electron orbits influenced by the earth's magnetic field, and they become elliptical, rather than circular. This dual path effect would not normally be noticeable except as fading due to phase cancellation, but when parts of the ionosphere are moving up or down at different speeds at different heights, the two refracted rays can have quite different frequencies – separated in frequency due to differential Doppler shift, and visible on a spectrogram. In this case we can estimate the frequency difference to be about 5Hz and the difference in speed of the refracting layers at about 150m/s (540km/hr). It's not that the actual upper atmosphere necessarily moves at this sort of speed, but the ionisation density can certainly change very quickly, causing a change in the effective height at this speed. The highly ionized solar wind driving this effect is not steady, and arrives in blasts at about 400km/sec!

The effect shown in Figure 3 lasted only a few minutes, and Dave was lucky to catch it. Both Peter and Dave are using Spectrum Laboratory spectrogram software by Wolf DL4YHF[6].

Double blow to analogue engineering

The well known analogue design expert Jim Williams died recently[5]. Over the years I knew of him, Jim worked for Linear Technology, Analog Devices and then National Semiconductor, but he will also be remembered for his EDN magazine articles. Jim was famous for his sense of humour, and those of us with messy workshops will identify with his workplace; there's a picture in the referenced article. Jim will be greatly missed.

In a real quirk of fate, within days we also lost another analogue expert, Bob Pease, who died in a motor accident on his way home from Jim William's funeral[6]. Bob worked for National Semiconductor, and was the front man for many of their widely attended technical seminars. Bob was an early adopter of spice modelling and also a bit of a character, wearing a long beard and driving (one might also say wearing!) an old VW beetle.

Time Ball Station is QRT

The well-known Time Ball Station building on the cliffs above Lyttelton Harbour is no more! The building was badly damaged in the first big earthquake (Feb 22)[9]. Although dismantling to preserve the important aspects of this historical landmark was quickly started, the second large earthquake unfortunately completely destroyed the building[10]. My thanks to Dave ZL3FJ for the photo links.

The Time Ball system provided accurate time to mariners in the port of Lyttelton, allowing them to check their chronometers in the years before radio time signals. The ball would drop at exactly 1pm each day. The Lyttelton station was first operated in 1876.

What to do with GPS

Many of you will have access to a GPS device of some sort. Most of these provide either graphical display of position etc, or send serial telemetry giving time, position, speed and bearing which can be used with a computer mapping

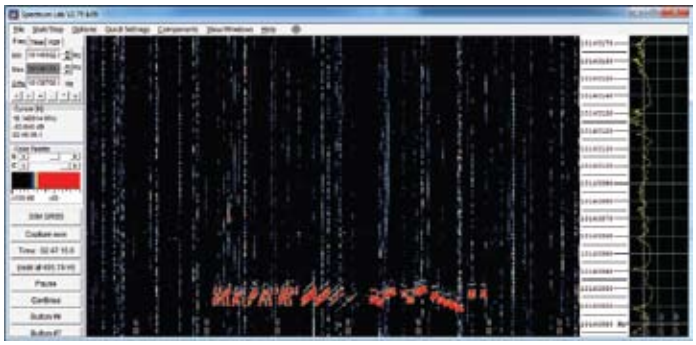


Figure 3. Blurred MEPT signal due to differential Doppler effects.

Figure 4. The ZL2AFP Nixie Clock.

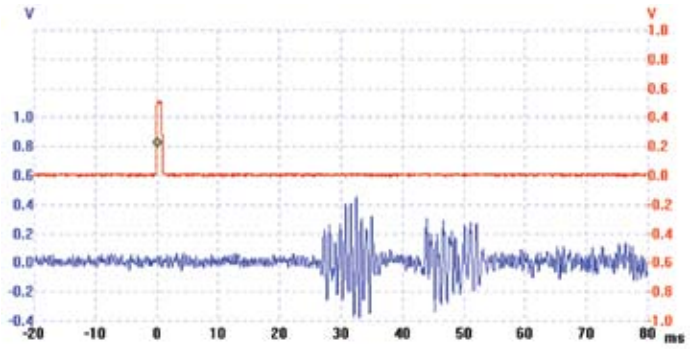


Figure 5. Oscilloscope showing delay on WWV tick.

program. This data is normally in a well documented format known as NMEA 0183, and typically sent at 4800bps[11]. There are plenty of useful applications for this data, including some good clock applications, one of which you will enjoy if you appreciate old test equipment. The ZL2AFP Clock looks and behaves just like an old Nixie-tube instrument, and in fact it works by displaying a series of real photographs I made of Nixie digits against the real background of a vintage Hewlett Packard instrument. It looks very realistic!

The clock can keep time using the PC internal clock, but better still, can also be set to use serial data from a GPS unit and so display very accurate GPS or local time. You can download this really cool clock from my website[10].

If you have a GPS unit with a one-pulse-per-second output (1pps), you are well placed to take advantage of some ham techniques which require very accurate timing. For example you might use it for frequency calibration, or make transmissions with GPS timing, so allowing other stations similarly equipped to measure the time of flight through the ionosphere. Try triggering your oscilloscope from 1pps and watching the time ticks received from WWV on 10MHz.

In Figure 4 you can see the GPS 1pps pulse (upper trace), which triggered the oscilloscope, and the seconds 'tick' from WWV (lower trace), received in AM mode. Why are there two ticks? Because both WWVH (Hawaii, 28ms delay) and WWV (Colorado, 44ms delay) are received. The ticks consist of a 10ms burst at 1200Hz. There's a nice PC sound card oscilloscope which can also be 1pps triggered[13].

In my next column I hope to present some ham shack applications for 1pps. As well as the obvious (using 1pps to calibrate or discipline frequency references), and using the nice sound card oscilloscope which I just mentioned, I will discuss Clicklock (a technique for LF reception with incredible sensitivity), and Chirpview, a system for tracking ionospheric sounders. If you know of any others, please let me know.

References

[1] <f6cte.free.fr/index_anglais.htm>
[2] <www.qsl.net/zl1bpu/MFSK/Technical.htm>
[3] <www.qsl.net/zl1bpu/NBTV/OFDM.htm>
[4] <www.igrin.co.nz/~peter/Grabber.htm>
[5] <www.users.on.net/~davroz/vk6di/argo-captures/argocaptures.html>
[6] <www.qsl.net/dl4yhf/spectra1.html>
[7] <www.edn.com/article/518496-Analog_guru_Jim_Williams_dies_after_stroke.php>
[8] <www.edn.com/article/518568-<Analog_engineering_legend_Bob_Pease_killed_in_car_crash.php>
[9] <homepages.ihug.co.nz/~tractorb/timeball/before.jpg>
[10] <homepages.ihug.co.nz/~tractorb/timeball/after.jpg>
[11] <en.wikipedia.org/wiki/NMEA_0183>
[12] <www.qsl.net/zl1bpu/SOFT/GPSclock_flashing_nixie.zip>
[13] <www.zeitnitz.de/Christian/scope_en>

Awards

Awards Manager: Alan Chapman ZL3GX
<awards@nzart.org.nz>

Unfortunately the Coast Radio Station ZLW award information arrived too late for last *Break-In.* When sending copy for inclusion in *Break-In,* please make sure that it arrives in plenty of time before the tenth of the month. I have to have my copy to the editor by the tenth so I need time to compile the column.

The Kawerau Branch is running the Woodskills Award again this year. The certificate is well worth collecting as it always includes photos of some of the finished products made at the festival.

Coast Radio Station ZLW

To commemorate the 100th anniversary of the first transmission from Coast Radio Station ZLW on Wednesday 26 July 1911, the Wellington Amateur Radio Club is putting the commemorative callsign ZM100ZLW on air from 26 July until 27 August 2011 and will be offering a special QSL card to all stations contacted. All amateur bands (MF/HF/VHF/UHF) will be used. It is also intended to use the 600m band and further details will be made available.

Rules for National Woodskills Festival Award; 1-14 September 2011

Members of Kawerau Branch will be available on the Awards net 3.677 each night at 8pm and also available on the repeaters and National system.

Contacts with Kawerau Branch 67 on any band ie HF, VHF, National System. Ten points required for ZL applicants (five points for DX stations) may be accumulated as follows:

ZL1KW worth 5 points, Branch President Barry ZL1CAY and Kel ZL1ASL Vice-President worth 3 points, any other branch member worth 1 point.

Award is available to all Amateur Operators or SWLs who accumulate 10 points or 5 points if DX. The Award application containing a copy of Log details or SWLs name and address plus $5 fee to be received by the Awards Manager, Branch 67 no later than November 1st each year.

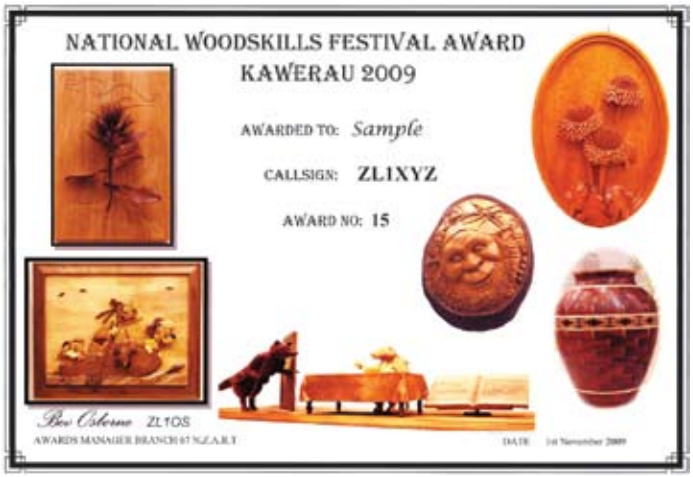
Applications for the award to: Awards Manager Branch 67 NZART, c/- Bev Osborne ZL1OS, 34 Cobham Drive, Kawerau 3127 New Zealand.

Club Awards

Clubs running short-term awards or new awards should send details of the award to me via email or at my *Call Book* address or the address below. Remember that *Break-In* is only published on even months and copy, including, if possible, a copy of the certificate, for inclusion, should reach me by the end of the even month.

The Awards Net runs on 80m, 3.677 MHz every night from 0800 UTC every night of the year. Every one is welcome to join in especially if you are mobile and in a rare county or district.

NZART Awards Manager, PO Box 1733, Christchurch 8140, <awards@nzart.org.nz>, <www.nzart.org.nz/activities/awards/>.



The 2009 Certificate; the certificate is different each year.

The Morseman

Gary Bold ZL1AN
<morseman@nzart.org.nz>

Feedback

Last month I asked whether anyone wanted me to continue this column, or whether I should quit and let somebody else write about something less ancient than Morse. 15 emails have arrived. All encourage, nay, some command me to continue. One said that "200 columns is a good half-way point". I read that the historical, non-Morse material I include is very interesting. Nobody offered to take over. So I'll continue, at least for the time being.

Review: The SS-40 Receiver

Jon, EA2SN, sends this review: "Jim Kortge K8IQY, is a QRP Hall of Fame member who has designed many rigs and accessories for QRPers. He's done a lot of research on crystal characterization, and their application to Variable crystal oscillators (VXOs). He's now created the SS-40[1], a 40 metre CW receiver, and assigned rights for a kit production to the *Four State QRP Club.* This will raise funds for the *Ozarkcon* QRP Convention.

"The receiver uses a large, easy-to-build board, which includes all connectors. No cabling is required. It fits in a TenTec® box , or in Europe one of the Minibox® series, which are very similar. Figure 1 shows a photo of the interior.

"It uses a tuned J310 FET preamp, followed by a Minicircuits™ mixer, an IF amp based on a low noise LT1253 op-amp, a four-pole, 500-Hz crystal filter, an NE602 product detector and an LM386 audio amplifier. The tuning range is 7.015 to 7.045 MHz, using a VXO having three crystals in parallel, with great stability. An effective AGC circuit and an audio mute are included. Even though the manual says that 20 hours are required to complete the building, a seasoned builder may do it in less than 5 hours.

"The "*SS*" acronym means "Sensitive and Stable"; and stability is excellent, with sensitivity comparable to high-end commercial transceivers. With the board on top of the bench, I was able to measure an MDS of 0.08 μV. AGC control gives a flat audio response above input signals of 10 μV.

"The crystal filter is excellent, highly symmetrical, and may be shifted to your preference easily. I used *Spectrogram* to obtain a plot of the frequency response.

"I also used Con ZL2AFP's software to measure the receiver's noise floor of the receiver. Jim had found this to be more than 40 dB below the typical noise floor on the 40 meter band. In my case, due to the high RF level at my shack, I measured "only" 30 dB. But the most amazing characteristic of this receiver is the low internal noise. With no antenna, one must increase the volume up to maximum to *hear* any hiss from the speaker! With the antenna connected, signals come up from nowhere when tuning up and down the band through the very narrow filter with great fidelity.

"This kit offers a great learning experience. It requires transformers and toroidal inductors, very easy to wind, and the outcome is an excellent receiver."

Jon, EA2SN

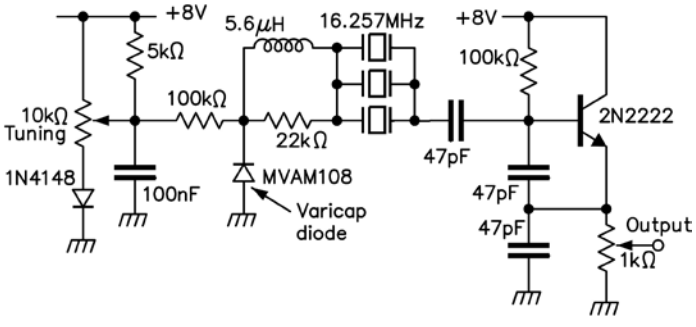


Figure 2. The SS-40 three-crystal oscillator circuit.

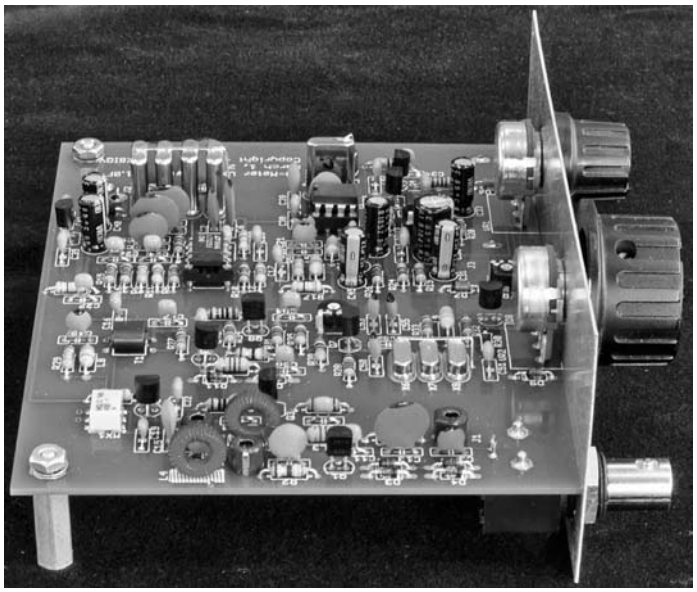


Figure 1. Interior of the SS-40 CW receiver.

The "Super VXO" Oscillator

Three parallel crystals? The SS-40's unusual local oscillator circuit is shown in figure 2. Indeed, it does use three nominally identical crystals in parallel! The frequency is varied by changing the reverse bias voltage, and thus the capacitance, of an MVAM108 varactor diode. Such "crystal pulling" is a standard VXO technique used by QRP constructors, since limited frequency coverage is quite sufficient for CW operation. But I had never come across a "multiple-crystal" configuration before.

This was discovered around 1980, when two Japanese Hams published the original article describing it–in Japanese[2]. Since then it's been used by other designers in both two and three-crystal versions. Using parallel crystals is found to extend the frequency pulling range to two or three times greater than obtainable with a single crystal.

Some background on Crystal Oscillators

Figure 3 shows *LTspice* simulations. At bottom left, the electrical equivalent circuit of a nominal 12 MHz crystal, energized by an AC current source. The resulting voltage across the crystal as a function of frequency, in arbitrary dB units, is shown in the top plot. Both series (11.831 MHz) and parallel (11.997 MHz) resonances occur, about 0.11% of the centre frequency apart. The right-hand circuit shows a Colpitts oscillator using this crystal, which you can alternatively simulate using a transient analysis, plot not shown. As with all oscillator simulations, because of the high crystal *Q*, (here about 128 000), the frequency starts low after turn-on, and increases to its steady asymptotic value very slowly. After 20 ms (about 200 000 oscillation cycles) the frequency is 11.929 MHz, about its asymptotic

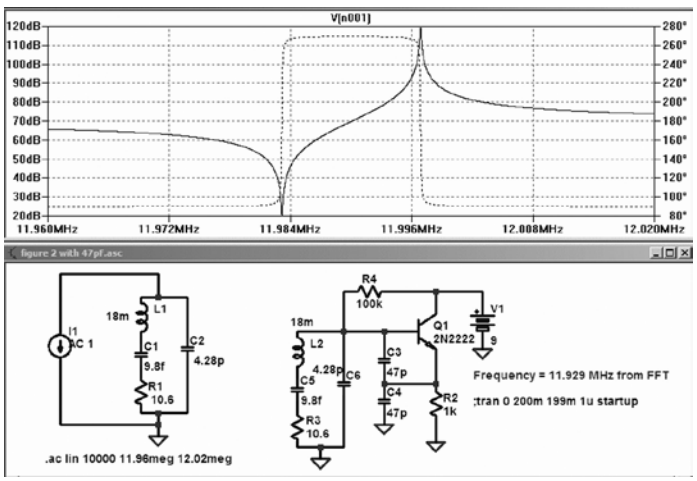


Figure 3. (top) A current-energised crystal simulation. (bottom) A Colpitts oscillator using this crystal.

value. This is always *between* the two resonances. Now, adding parallel capacitance across the crystal will pull the oscillation frequency lower.

Why does the multi-crystal version enable a higher pulling range? I consulted Murray ZL1BPU and his crystal expert. They hypothesized that using 3 crystals in parallel effectively reduces the load capacitance that each crystal "sees" to a third of its physical value, thus increasing the trim sensitivity to variation of an external capacitance. But if the separate nominal crystal frequencies are too far apart, the tuning range will exhibit sudden jumps.

Has anybody else built such a multi-crystal oscillator? Tell us about your experiences.

An "Octave" GUI

I've raved about *Octave*, the freeware version of *Matlab*, in past columns. The raw *Octave* window has some unfriendly quirks, for example you can't paste directly into it using "*control/v*". Several authors have written more "user-friendly" front ends for it. I'm currently using "*Xoctave*", a completely free program, just over 2 Mb to download[3]. It installs painlessly, asks you where "*Octave*" lives, and fires up.

It includes an editor, but you can also invoke the standard *Octave* editor from the command line. *Octave* "help" documentation can be displayed in standard Microsoft® "chm" format in a separate window. Program development seems to have stopped in 2009, so the "help" file refers to an earlier version of *Octave*, but few important features have been added since then. And anyway, you can download the free, 3.6 Mb PDF help file from the *Octave* website.

In past columns I've used some of the more sophisticated functions that *Octave* supplies, like FFTs, which has put some people off. But *Octave's* outstanding feature is its ability to manipulate complex numbers. Thus, if you understand a little AC circuit theory you can evaluate and plot the responses of circuits containing reactive components.

What was Marconi's frequency?

My description last month of the enigma of Marconi's first transmission caused much interest. Did he hear it, or didn't he? Everything hinges on the frequency used!

Why? Ratcliffe showed that a transmission on "Broadcast-band" frequencies would be too highly absorbed, but an HF one might have been received, because of its lower attenuation. He postulated that a high coupling coefficient in the aerial-tuning circuit could have produced a "double-humped" radiation frequency distribution, and I showed an LTspice simulation in the last column, using Ratcliffe's reconstruction of Marconi's circuit. This demonstrated that the circuit he published does predict such a response. Incidentally, my simulation makes a simplistic assumption about the spark gap. Can you pick it?

What frequency did Marconi and his engineers think was used? Fleming, in a 1903 lecture, said "305 metres (980 kHz) or more". In a 1908 lecture Marconi said "366 metres" (820 kHz), and in a recorded lecture in the early thirties, "about 1800 metres" (166 kHz). Why did they quote these different figures? Because they didn't actually know. These numbers were all surmises, based on their suppositions about the circuit.

Fleming was asked again, much later, in a 1935 interview. He replied:

"The wavelength of the electric waves sent out from the Poldhu Marconi station in 1901 was not measured because I did not invent my cymometer or wavemeter until October, 1904. The height of the original aerial (1901) was 200 feet, but then there was a coil of a transformer or 'jiggeroo' as we called it, in series with it."

Digression: Fleming's cymometer was a series-resonant LC circuit. The inductor was coupled to the antenna tuning circuit, and the indicator was a neon tube placed across the capacitor. Thus, a rudimentary form of "grid-dip meter". But how did he calibrate it? In 1904, RF sine-wave signal generators hadn't been invented. Since he couldn't "calibrate" it experimentally, I believe that he inferred the wavelength scale from calculated values of L and C.

His capacitor was two concentric brass tubes, separated by an ebonite sleeve. The inductor was a solenoidal coil, thin enough to be considered "long". The outer capacitor tube could be slid to overlap the inner one by varying amounts, thus varying the capacitance. This outer tube was attached to a sliding contact on the coil, varying the inductance in synchronism. Analytic expressions for the values of coaxial capacitors and long solenoids were known at the time, and by assuming these, the instrument could be calibrated theoretically. With *L* and *C* varying simultaneously, the resonant wavelength varies linearly with the position of the outer capacitor tube.

Georg Graf von Arco of the Telefunken company is usually credited with inventing the wavemeter, devising a similar device in 1903, The Marconi company didn't market a commercial wavemeter until 1906, which measured wavelengths from 200 to 1040 metres.

Marconi's transmitting aerial

Can we deduce the Poldhu transmitting wavelength by examining the aerial? Fleming, and later writers, considered it the major influence on the radiation spectrum. John (Jack) Belrose has researched Marconi's equipment extensively, and described it in a 2001 conference paper[4]. This is well worth downloading and reading for additional details.

Twenty 200 foot (61 metre) masts were erected in a 200 foot diameter circle, at both Poldhu and Signal Hill. Their tops were joined by a cable. From this hung 400 equi-spaced wires, each (probably) insulated at the top and connected at the bottom, forming an inverted cone. Marconi's engineer Vyvyan thought the guying system insecure, and indeed, both systems blew down in storms shortly afterwards.

Marconi hurriedly erected a more stable "fan" aerial at Poldhu, using only two masts, connected by a horizontal cable at a height of 150 feet (45.7 metres). From this hung 54 wires, again connected at the bottom.

Photographs of these two aerials are shown in Belrose's paper[4]. But the second, of the fan aerial, appears to be a re-touched version of the first, with wires of the cone erased, and fan wires inserted! Belrose states that no true photograph of the final fan exists.

Belrose built, and experimentally measured the impedance of a scaled-down version of the transmitting aerial. He concluded that its original response exhibited two series (resistive only) resonances, at about 935 kHz and 3.8 MHz, roughly in the same regions that my *LTspice* simulation showed. The lower and upper resonances exhibited radiation resistances of about 20Ω and 100Ω respectively. The original tuning "jigger" connecting it to the secondary spark circuit has been lost, but it would almost certainly have modified the aerial system's response. Belrose concludes that its characteristics, and the higher radiation resistance of the upper resonance, meant that almost all the power would have been radiated at the lower resonance, and he estimated this, modified by the jigger, to be about 500 kHz[5]. And this could not have been heard with the primitive receiver system Marconi used.

For the receiving aerial, Marconi used a single wire, about 152 metres long, held aloft by a kite. He proposed to use a "syntonic" (tuned) receiver, but the high wind caused the wire to bob and weave erratically, making tuning impossible. He subsitituted an older, untuned receiver, probably using an "Italian Navy Coherer".

Next column, my own conclusion. Stay tuned.

Morse in Movies

Most of us probably saw the film "*Titanic*". A number of scenes deleted in the final cut have been uploaded to *You-tube*. One depicts the reactions of the *Titanic's* radio operators, Jack Phillips and Harold Bride, as they hear interfering signals from the *California*, stopped in ice ten miles away[6]. A spark gap is shown, and "Morse" is sent. Except that it's clearly not Morse, merely random key tappings. The language is somewhat salty, which may be why the scene was deleted.

Another, from a "*Titanic*" TV miniseries, has also been uploaded[7]. The sound-track contains the distress signals received by the *Carpathia*, except that they are heard arriving in modern CW, at about 30 wpm, quite impossible at the time!

Why do movie-makers not take

continued on page 36

the trouble to get these historical details correct? It would be a simple matter to set up a spark-gap signal audio simulator and employ a Ham to send real Morse. Can anyone point me to a movie clip where the Morse is correct?

Rare and unusual key wanted

Herman VK2IXV, a dedicated key collector and restorer, emailed me to ask "Could you spread word around that I am looking for an Australian Pendograph to buy (or to swap for another bug/jigger, including The Auto Simplex)?"

If you can help, email me, and I'll put you in touch with Herman.

Last Month's Problem

"See figure 4(a), which shows an AC bridge. What is it called, and what does it measure? Derive the balance conditions, and show that for particular values of the resistors, only one control (the ganged capacitor) can be used to obtain a balance."

Ron, ZL1AI submitted a complete, correct solution. Ross ZL3TFK identified the bridge and component values needed, but bogged down in the mathematical derivation. Not surprising, it's a bit complicated.

This is *Wien's frequency bridge,* and is used (of course) to measure frequency. Write the standard balance equation in terms of the four impedances in the four arms. Since two of the impedances are reactive, this results in a complex equation, and there will be two balance conditions. Consider the real and reactive parts of the balance equation separately. Substitute

$R_3 = R_4 = R$, and

$R_1 = 2R_2$

and you'll find that the real balance condition is always satisfied, and the reactive balance condition gives the angular frequency of the source directly as

$\omega = 1/(RC)$.

When I was a student, before the days of cheap digital frequency meters, this was the only simple way of measuring audio frequencies. It was a standard experiment to set one of these bridges up with decade R and C boxes and measure the frequency of an unknown source. For solution details, see the link "*Wien frequency bridge*" on my website.

This month's problem

This week, a simple DC exercise. But of a type still beloved by first year Physics University lecturers to perplex the minds of students. See figure 4(b), a network of batteries and resistors.

What is the voltage V_0?

For the purposes of calculating the current through any external resistor connected across V0, the circuit can be replaced by one consisting of a single battery and a single resistor. What are their values?

References

[1] See the SS-40 kit at <http://www.wa0itp.com/4sqrpkitindex.html>

[2] See the "SuperVXO" references at <http://www.qsl.net/7n3wvm/supervxo.html>

[3] Download "Xoctave" from <http://xoctave.webs.com/>

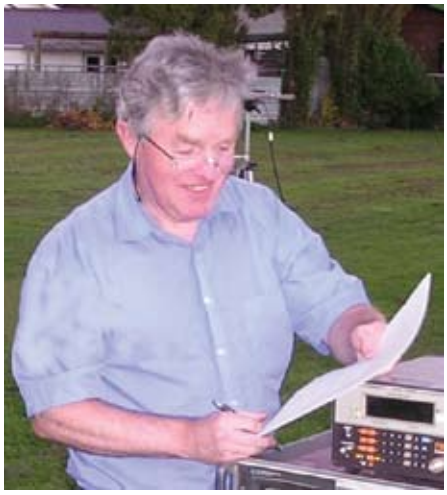
[4] John Belrose paper on Marconi <http://www.radiocom.net/Fessenden/Marconi_Reprint.pdf>

[5] John Belrose on Fessendon <http://www.radiocom.net/Fessenden/Belrose.pdf>

[6] Deleted radio room scene from "Titanic". <http://www.youtube.com/watch?v=U8PLDqqdpu0>

[7] Titanic TV miniseries, Carpathia. <http://www.youtube.com/watch?v=v00E6fNX2vk&feature=related>

Life membership Doug Ingham ZL2TAR



Doug has provided long and dedicated service to NZART and its members over a period of more than 30 years. The contribution he has made to the wellbeing and growth of amateur radio is both unique and significant. Wellington VHF Group recommended Doug ZL2TAR for the honour of Life Membership to NZART in recognition of his meritorious service.

Doug first joined NZART, Branch 05 Christchurch in 1959, whilst still at high school. After the family moved to Upper Hutt, he joined Branch 63 Upper Hutt in 1961. He gained his call sign ZL2TAR in September 1963.

Some highlights of Doug's service to fellow amateurs are:

- 1985 Appointed Frequency Management Working Group Technical Advisor
- 1966-1968, Assistant Editor of *Break-In* magazine
- 1987-present FMTAG Frequency Coordinator
- 1989 Awarded Life membership Wellington VHF Group Branch 74
- 1991-1996 President of Wellington VHF Group Branch 74
- 1997-2002 President of Wellington VHF Group Branch 74
- 2000 – present, FMTAG Radio Licence Applicant
- 2004 – present First ever MED approved Radio Certifier
- 2004 Awarded NZART Amateur of the Year

As FMTAG Radio Licence Applicant, for ten years from 2000 to present, Doug has processed more than 200 licence applications on behalf of radio amateurs.

As the first ever MED approved Radio Certifier, for 6 years from 2004 to present, Doug has saved NZART conservatively more than $40,000 in MED fees.

Doug was responsible for the re-design of the National System to overcome interference issues. He coordinated the re-engineering of all the National System stations, bulk buying frequency crystals and coordinating frequency change overs. In recognition of this huge effort he was awarded NZART Amateur of the Year in 2004.

Doug is a prolific writer of technical articles, which have appeared in both *Break-In* and Q-Bit journals. In all he is author of more than 200 technical articles in professional and amateur publications, explaining sometimes complex concepts in a very readable manner. In this way he has made a significant contribution to the amateur body of knowledge.

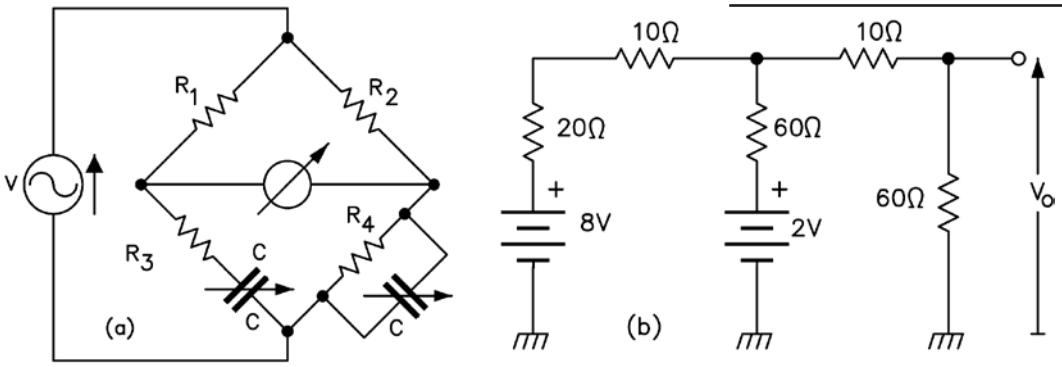


Figure 4. (a) last month's problem; (b) this month's problem.

NZART Stolen Equipment Register

NZART Council has decided to discontinue the Stolen Equipment Register, effective immediately. All equipment which is stolen should be reported to your local Police Station.

Satellite Orbits

Andrew Barron ZL3DW
<ad.barron@xtra.co.nz>

AMSAT NA has submitted comments to the US Department of State/Directorate of Defence Trade Controls (DDTC) on 13 June, 2011 in response to their proposed rule making on International Traffic in Arms Regulations (ITAR), which would provide clarification on defence services, noting that public domain material is not subject to ITAR. This is relevant because the ITAR rules have so far prevented AMSAT North America from sharing technology and information with AMSAT DL and this has delayed, or at least not helped speed up, the development of the German P3E and P5E satellites. It is hoped that the new ITAR ruling will state that 'open source software' and 'public domain' publications including online publications will not be subject to the ITAR rules and therefore technology such as SDR software and hardware developed by AMSAT in the USA will be able to be given to the German AMSAT group. It seems strange that such rigid rules apply but AMSAT has been in hot water over this issue before.

Students at Istanbul Technical University are working on a 3U CubeSat that will carry a linear transponder for SSB/CW amateur radio communications. *TURKSAT-3USAT* will carry a 50kHz bandwidth 145/435 (V/U) linear transponder, beacon and telemetry downlink. It is hoped to have an early 2012 launch into a Sun Synchronous Orbit (SSO) at around 680km.

A *sun synchronous orbit* is a polar orbit where the altitude is set so that the satellite passes over a specific location at the same time every day. For example, a satellite in a sun-synchronous orbit could measure the air quality of Christchurch at noon every day. Having the satellite available at the same time every day makes data collection and control convenient for the ground control station, but is not common for ham radio satellites. A "dawn / dusk" orbit is a special type of sun synchronous orbit where the satellite orbits either just ahead or just behind the terminator between day and night, so that the solar panels are always in daylight. This is great if the satellite has small or no batteries. The orbit of Turksat will made to cross over Istanbul at the same time every day. It will also pass over your QTH at the same time every day, but that time may not be very convenient for QSOs, we will have to wait and see when the Kep data is available. The 680km altitude means that the coverage footprint will be small which will limit contacts between VK and ZL.

Fastrac satellite which is scheduled to be made available for APRS use in the future.

FASTRAC 1 "Sara Lily" FASTRAC 2 "Emma" are the first University built satellites to perform a separation and then subsequently communicate with each other. The two satellites designed and constructed by students at the University of Texas successfully separated in space, completing the most crucial goal of the mission since its November 19 launch and making them the first student-developed mission in the world in which satellites orbit and communicate with each other in real-time.

The FASTRAC mission is divided into two basic phases. Both mission phases rely heavily on the participation of the amateur radio community.

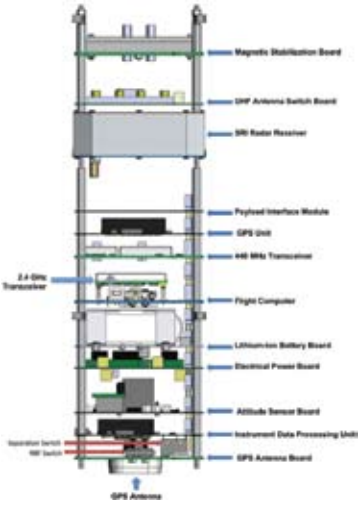
The first phase is the science portion of the mission. During this phase the two satellites will be sharing GPS data as long as they are within range of each other. The GPS data will be processed on board each satellite and then stored in flash memory to calculate an on-orbit relative navigation solution. A big part of the FASTRAC mission is proving that clusters of inexpensive satellites can figure out where they are in relation to each other. This will allow future satellite constellations to actually maintain a desired shape for purposes such as astronomy, radar, or communication.

Participating amateur radio ground stations can play a major role in collecting this data and relaying it back to the project Website.

The second phase of the mission begins by reconfiguring the satellites for use by the amateur radio community. The satellites will be reconfigured so that they can be used as digipeaters and form part of the Automatic Position Reporting System (APRS) network. The capabilities of these satellites are governed largely by the functionality of the Kantronics KPC9612-Plus TNC. The satellites will be reconfigured after the primary mission to serve on the APRS network.

FASTRAC 1 "Sara Lily" Downlink(1200/9600 Baud) 437.345 MHz FM, FASTRAC 2 "Emma" Downlink(1200/9600 Baud) 145.825 MHz FM, The Beacons are on the same frequencies (1200 Baud) AX.25 AFSK

The communications architecture is based on a system flown on PCSAT2. The FASTRAC implementation consists of two receivers, one transmitter, a terminal node controller, a transmitter relay board, and a receiver relay board. <http://fastrac.ae.utexas.edu/our_project/overview.php>



Above and below: Radio Aurora Explorer (RAX) cube sat.

Radio Aurora Explorer (RAX), is a 3 unit CubeSat (10 cm x 10 cm x 34 cm) weighing 2.8 kg. It was designed and built by University of Michigan students and faculty in cooperation with SRI International. The primary objective of the mission is to use an onboard radar receiver in conjunction with a powerful radar station in Alaska to study the formation of a plasma anomaly known for causing the scintillation of radio signals in the UHF and higher bands. RAX carries a 9600 baud UHF digital transceiver. Using the call-sign RAX-1, the satellite sends telemetry on 437.505 MHz. Amateurs are invited to download the free telemetry decoding software and submit reports to the mission website at <http://rax.

continued on page 38

Monitoring Service

Monitoring Service Co-ordinator: John Martin ZL1GWE
<john.martin@nz1.ibm.com>

Greetings to all, including Short Wave Listeners and contributors. Just when we thought the Over the Horizon Synthetic Aperture Radar (OTHSAR) had begun to disappear on 40 m, it came back with a vengeance decimating the CW segments again. But had it really gone away or just moved to the maritime bands? Keep an eye on the forthcoming WRC-12 particularly radiolocation services involving Oceanographic radar (CODAR) and the HF spectrum. The removal of an intruder on the 40 m band, in June 2011, must be a record: a 7118 kHz USB broadcast suddenly turned up from the US Armed Forces Radio & Television Service (AFRTS), with collaborated reports from ZL and VK, via <Intruderwatch@googlegroups.com> and <ms@nzart.org.nz>. John VK4TJ, contacted colleagues and the ARRL HQ phoned the base directly and immediately the transmission moved back to 7811 USB. Once more, international collaboration was successful. If only every intruder was that easy to remove.

On a regular basis, someone encounters issues with interference, whether it is a transmitting source, or electrical noise. I often go through a disciplined process, every time I find a new intruder or unknown interference signal.

My own personal discipline used for Intruder watch activities, includes:

- Is this a known source of local interference within the shack i.e. ADSL, Computer noise; removal soon eliminates and confirms the known source? Helpful hint from experience: Do not turn off the washing machine, whilst the XYL is around, without first notifying one's partner!
- Is this a known source of local interference within the house ie washing machine, television, lights, water pump, heat pump etc? Turning off the source eliminates the source effectively and provides confirmation.
- An alternative is to place the radio equipment on to battery power, and switch off the mains, as a quick means of verifying sources of interference within the vicinity. Isolates range and source of interference.
- An effective means to identify local sources of interference is the wide band portable receiver using AM mode, which can quickly identify the source.
- If the source of interference is outside the house, does it have a particular direction; is it strong, does it have wide band coverage? Again a portable wide band receiver on AM, either walking around the vicinity or jumping into the car and driving about, can quickly assist one to identify the source. Substituting the aerial with a small loop, rather than a vertical aerial can be useful for direction finding. Helpful hint: To preserve life and limb, ensure you enlist the assistance of a second person as a driver, eg the XYL, leaving you free to handle the receiver.
- Is there anyone else nearby who can confirm the interference exists and your observations?

Some of the steps you can use are:

1. Collect information about the interference
2. When do you get the interference?
3. What does the interference sound like?
4. What does the interference look like?
5. Do any of you have a particular method for tracing interference?

In accordance with the NZART 2002 policy on Radio Frequency Interference (RFI)[1] the NZART EMC Officer should be contacted: Brian <zl3be@nzart.org.nz> or John <ms@nzart.org.nz> or Gary <ms2@nzart.org.nz> for Section C of the policy.

Other guidance sources include: ARRL Radio Frequency Interference[2], RSGB Electro Magnetic Compatibility (EMC)[3].

Until next time, keep those reports coming. Report intruders to: <ms@nzart.org.nz> or <ms2@nzart.org.nz> or <IntruderWatch@GoogleGroups.com>.

The artwork for the IBM Centennial call-sign special QSL cards has been despatched for ZL1OOIBM; those wishing to receive one, can arrange QSOs with me by mutual agreement or listen out CW, SSB or FM see Picture 1 and Picture 2. Note: Permission to use the Icon of progress (Patents & Innovation) has been obtained from IBM.

Finally, it is with deep regret, the NZART Monitoring Service acknowledges the passing of a very supportive colleague, Jamie Pye ZL2NN. We thank him for his wonderful contribution via the NZART website and support of the Monitoring Service.

Until next time, keep those reports coming in.

John (ZL1GWE) / ZL1OOIBM

Intruder System Observer League Table 2011 (up to end of June 2011)

Contributor Name/Call-sign	Number of reports received	Number of reports verified
John ZL1GWE	315	315
Bob ZL1BAD	153	153
Gary ZL2iFB	34	34
Dallas NZRDXL	10	10
ZL2TZE	4	4
ZL2CC	2	2
Zl1TPH	2	2
ZL1CC	1	1
ZL1AAO	1	1
Luke VK3HJ	1	1
Others	0	0

References

[1] <http://www.nzart.org.nz/Council/policies/2002-rfi-policy/>
[2] <http://www.arrl.org/radio-frequency-interference-rfi>
[3] <http://www.rsgb.org/emc/>

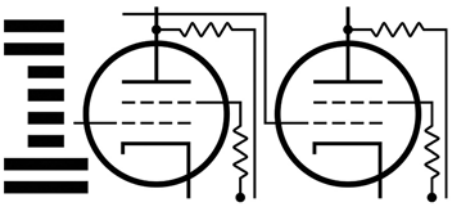
◂ *continued from page 37*

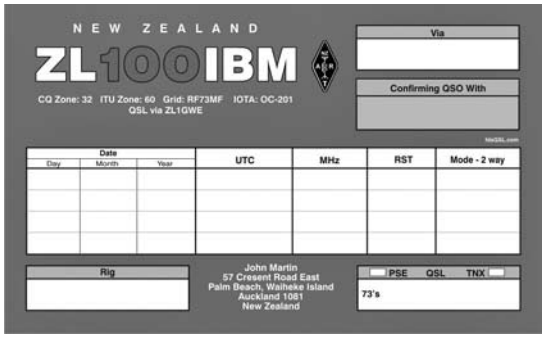
engin.umich.edu/?page_id=311>, however RAX is currently operating in a low power mode due to a solar power generation issue that was discovered several weeks into the mission. This means that the beacon must be silenced more often than not to recover battery energy that was spent on the power-intensive science and engineering operations. A schedule of beacon operating times is available on the website.

References

Southgate ARC website, AMSAT, and project websites. Please send me any news, feedback, requests, questions, hints, ideas, construction projects, interesting new purchases or whatever. I always need updates on the local activity <zl3dw@nzart.org.nz>

73, *Andrew ZL3DW*





Old Timers' Club

Roy Simon ZL2KH
<zl2kh@xtra.co.nz>

Secretary/Treasurer:
Roy Symon, ZL2KH
Mail:
25 Annandale St,
New Plymouth
Phone:
06-758-2156
E-mail:
<zl2kh@xtra.co.nz>
Monday Evening SSB Net:
Net details: 2030 hr (local time) each Monday, on 3.870 MHz LSB.

Annual General Meeting

The Annual General Meeting of the Old Timers' Club (ZL) was held at 0900 hr on Sunday, 5 June 2011 at the Silverstream Retreat in Upper Hutt. Ivan Horn, ZL2ATU (the Grand Old Man), chaired the meeting. There were 24 present and apologies were received from 16 members.

All the officers were re-elected by acclamation. They are:

Grand Old Man: Ivan Horn ZL2ATU.

Secretary/Treasurer: Roy Symon ZL2KH

Net Controllers: Roy Symon ZL2KH, Don Dalrymple ZL3SZ, Stuart Watchman ZL2TW, Pete Moore ZL2AUB, Ivan Horn ZL2ATU and Doug Alexander ZL2AWF (AM Net).

District Representatives: 1st District: Tom Spackman ZL1WW, 2nd District: Stuart Watchman ZL2TW, 3rd District: Don Dalrymple ZL3SZ, 4th District: Peter Anderson ZL1LR.

Call-sign Trustees: Peter Anderson ZL1LR, Bob Banks ZL1AUI.

Scribe for OTC column,* Break-In*: Roy Symon ZL2KH

Honorary Auditor: Malcolm Potts ZL2MRE

The Montgomery Cup (for best article in *Break-In* by an OTC member during the preceding year) was awarded to Reg Motion ZL2LX for his articles on Radio in the New Zealand Post Office.

The next AGM will be held in Nelson in conjunction with the NZART Conference 2012.

There was a slight decrease in membership during the year with 13 members joining and 17 Silent Keys being reported. There are 414 current members listed in the membership database.

The SSB net on 3.870 MHz each Monday evening at 2030 hr has continued. The net controllers are Don ZL3SZ, Stuart ZL2TW, Pete ZL2AUB, and Roy ZL2KH. The AM net on 3.850 MHz is controlled by Doug ZL2AWF. Thanks to all of these for their help. 57 members checked in at some time during the year.

OTC News

The news is currently broadcast each Monday evening on the SSB net. News is circulated by email every month to those for whom an email address is recorded. There are currently 189 members on the list.

Certificates and Cards

Certificates marking the milestones of 50, 60, 70 and 75 years on the air have been sent out where appropriate (9 x 50 years and 13 x 60 years). Birthday cards have also been sent to those notching up another even decade (1 x 50th, 4 x 60th, 6 x 70th, 8 x 80th and 3 x 90th). Sympathy cards were sent to the families of the 17 members who became Silent Keys.

Break-In page

The OTC page has appeared in each issue of *Break-In.* More copy is needed from members if this is to continue.

New Members

Six new members were welcomed. They are:

- 1279, ZL2AFW, Brian Jones, Wanganui
- 1280, ZL2AVL, Bill Luscombe, Waiouru
- 1281, ZL1TPH, Steve Hayman, Auckland
- 1282, ZL1BAB, Bill Cooper, Papakura
- 1283, ZL4TAE, Terry Thomas, Dunedin
- 1284, ZL4TAC, David Parish, Johnsonville

ZL2KH and ZL2ATU.

Silent Keys

There are five members to farewell this month. They are:

- 800, ZL4ML, Murray Lamont, Dunedin
- 905, ZL2AKV, Neville Copeland, Wellington
- 956, ZL4QG, Frank Nilson, Sawyers Bay
- 964, ZL1BAV, Chas Vial, Auckland
- 400, ZL3PD, Ron Pluck, Christchurch

A sympathy card from OTC members has been sent to each family.

Certificates sent out

Six members have qualified for 50 year certificates:

50 Year Certificates:

- 1065, ZL3KD, George Harding, Wellington
- 758, ZL1SZ, Murray Evans, Whakatane
- 1214, ZL3VP, Gareth Bradshaw, Christchurch
- 1279, ZL2AFW, Brian Jones, Wanganui
- 1280, ZL2AVL, Bill Luscombe, Waiouru
- 823, ZL4AE, Bill Olsen, Dunedin

Congratulations for half a century of enjoyment in amateur radio.

From the desk of the Grand Old Man

Greetings, I was delighted to be re-elected for a second term as Grand Old Man ZL at the Annual General Meeting of the Old Timers Club (ZL) in Upper Hutt in June.

The photo shows NZART President (and OTC Secretary) presenting the OTC cup to OTC Grand Old Man, Ivan ZL2ATU.

ZL2AFW.

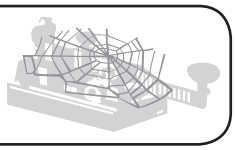
As they used to say at the Circus;. "for the first time in New Zealand!!" Well, for the first time in the history of Branch 48 (Wanganui) the Grand Old Man presented a 50 year certificate to one of its club members.

It was indeed, my honour and privilege, to present Brian Jones ZL2AFW with his 50 year certificate from the Old Timers Club (ZL). My association with Brian goes back many years, in fact, to when I was first licensed. Brian had his own business as a television and radio repairman. He was a busy man, but, as we all know, if you want something done then ask a busy man. Brian took on the task of converting a Pye Cambridge for me to enable me to work on 2 metres. Nearly at its completion, the split was changed and we had to order new crystals from, I believe, a firm called Hatfields. Brian then persevered with this project until it was 100% converted to FM.

continued on page 40

Silent Keys

The Association deeply regrets to record the death of the following members and extends its sympathy to the bereaved.



Silent Keys: guidelines to contributors

Contributors are requested to limit their obituaries to between 200-400 words. Content should focus mainly on the amateur radio activities of the deceased. Normally photographs cannot be included.

Jamie (James) PYE–ZL2NN (ex-ZL2TGP) 1940–2011

Former NZART Councillor, IARU Liaison Officer, and NZART Honorary Life Member Jamie Pye ZL2NN became a silent key on Saturday 2 July after a brief illness. Family, friends and many from the amateur radio community celebrated Jamie's life at a service at the Kingswood Centre in Upper Hutt on Wednesday 6 July.

Born in 1940, Jamie commenced his education at the end of the war and concluded his formal education in the 1950's at Wellington Tech. He entered the Post Office as a radio cadet, trained and qualified as a Technician. He later went to work for Tisco as a TV serviceman and independently studied and gained his NZCE. Some years later Jamie left TV servicing and moved to tutoring at the Technical Correspondance Institute. Jamie retired early to care for his XYL Gael ZL2SZ when she became unwell.

Jamie was first licensed in 1966 as ZL2TGP upgrading to ZL2NN in 1970. For Jamie, ham radio was a family affair. He encouraged his wife Gael ZL2SZ to obtain her ham licence and also son Jim ZL2PU. While his daughters Elsa and Jan both had ZL listener call-signs. Jamie and Gael were regular attendees at both NZART conferences and VHF conventions. As a family they participated in National Field Days and were very active locally in AREC and Civil Defence.

A great supporter of Upper Hutt Branch 63, Jamie was a member of the original design team for the first Mt Clime VHF Repeater. He was elected branch secretary in 1974. In 1975 he was awarded the very first "Branch 63 Merit Award" for the design, construction and commission of the Mt Clime 10 Metre Beacon. In 1978 he proposed and constructed a 6 metre beacon. In 1980 he was elected President of the Branch. Throughout the 1980's Jamie tutored many radio classes and proudly had a 100% pass rate. He was made a Life Member of NZART Upper Hutt Branch 63 .

At this time, Jamie became more involved in the administrative aspects of NZART. He was elected to NZART Council in 1983 and remained on Council until 1993. He was secretary of the first Frequency Management Working Group (FMWG) the forerunner of FMTAG. He has since these early days continued to produce many of the repeater and beacons maps, and band plans for our annual *Call-Book*. Jamie was also responsible for several major revisions of the NZART Basic Radio Training manual.

Whilst on NZART Council and for many years afterwards Jamie made his mark on the international stage, with solid contributions to the International Amateur Radio Union (IARU) and IARU in Region 3. Not only was he the NZART delegate to many IARU Region 3 conferences but also the key editor and contributor to many of NZART's conference papers.

Past President and NZART Honorary Life Member, Terry Carrell ZL3QL, remarked in a contribution to the NZART eulogy, that Jamie on so many occasions pulled the NZART team together with his firm stance for the association and his humoured approach to the tasks.

In November of 2000 Jamie had a serious accident that left him severely physically handicapped and totally wheelchair bound. Despite this new situation, Jamie came back fighting, with a keenness to undertake whatever duties he could still manage. He continued to work for our IARU overseas committee as well as producing maps and bandplans for *Call Book*.

In 2005 Jamie was awarded the highest honour that our Association can bestow that of Honorary Life Member of NZART, for his valuable and distinguished service.

In June of 2006 he took over the role of editor of the association's twice monthly publication *"Headquarters Info Line."* Jamie's 110th and final issue was published on 19 June.

Not content with this role, Jamie was successful in his application for the role of NZART Webmaster being appointed to this position in 2008, a position he still held at the time of his passing.

These words cover but a fraction of the contributions to our Association and achievements by Jamie. He is best described with the following words– a family radio ham, a volunteer, a national and international ham, a technician, an editor, and dedicated webmaster. We will continue to celebrate Jamie's memory with all the great things he achieved through his dedication to our association and amateur radio.

NZART extends to son Jim ZL2PU, daughters Elsa and Jan and their respective families' our deepest sympathy.

Jim Meachen ZL2BHF
Mark Gooding ZL2UFI

Merv Passau ZL1AKX, 1935-2011

Merv was born in Te Awamutu on 25 September 1935. He moved to Papakura where he started an automotive business but then moved into selling batteries for a well known Auckland-based firm before moving into the real estate business. Merv was also a member of the Masonic Lodge Society.

Merv passed the amateur radio exam and obtained the call-sign ZL1AKX in 1952. He joined the Franklin Radio Club and eight years later, along with a few others, formed the Papakura Radio Club. Merv was involved in all early club actives such as National Field days, transmitter hunts, and AREC exercises. He almost single-handedly built the first radio clubrooms in Wood Street. Merv was made a life member of the Papakura Radio Club in 1999 and it was good to see him attend the Club's recent 50th celebration.

Merv was President and AREC Section leader during the early years for the Club and also was on NZART council from 1985 to 1990, and Vice-President of NZART from 1987 to 1990.

Merv was one of the first radio operators to be involved with what's now known as the Rally of New Zealand; he used very basic communication and then helped develop the AREC communication system to what we have today. Merv had a large input to the development of the repeater controllers used to run the UHF National system. These same controllers were also developed for UHF/HF link repeaters and he also helped with the early development of LSAR VHF repeaters.

Merv suffered has first stroke in 1987 which slowed his involvement with radio projects and club events, but was always available to give advice on various matters. His health slowly deteriorated over the last few years and he had been in and out of hospital twice with heart problems before he passed away peacefully on 22 May 2011.

Our thoughts go to his wife, Val, and family. 73, de Branch 65

Richard Gamble ZL1BNQ

◄ *continued from page 40*

I felt after all this time (some 32 years later) that, in presenting this certificate to Brian, I was in some small way returning the kindness that he had once extended to me as a new Ham.

At the same club meeting Branch 48 patron, Strath Davis ZL2AAJ, presented a certificate acknowledging Brian's service to the Branch.

Congratulations Brian. Oh, and by the way, the two silent keys on the wall in the background have the nicknames of Sam and Fred.

The photos are of Strath ZL2AAJ, Ivan ZL2ATU and Brian ZL2AFW; and also Brian ZL2AFW holding his certificates (with Sam and Fred in the background. These photos were taken by Russell ZL2AXN; thanks, Russell).

73 from ZL2ATU Ivan, Grand Old Man, from Wanganui (no "H").

Roy Symon ZL2KH, OTC Scribe

WARO – nz womens amateur radio operators

with Topsy ZL2LS, Sharon ZL2BQ and Ngaire ZL2UJT
<waro@nzart.org.nz>

Once again Conference has come and gone for another year. It was nice to see you all there and meet up with you face-to-face, and with many WARO members taking part in the alternative program. This is always a great opportunity to catch up with old friends and make new ones.

The WARO AGM was held on the Sunday morning with ten WARO members attending. We were fortunate to have four new members join this year; Judy ZL2OBE, Heather ZL2TYF, Althea ZL2KAT and Lyn ZL2KW, and we look forward to hearing some, if not all, of you up on HF some time soon.

This being our first *Break-In* column we hope that we get lots of contributions for future *Break-In*, and you will get lots of pleasure reading them as well. Remember this is your column, not ours, so the more that you put in, the more you will get back from it, so come along and help support this so we can make it a great read for all. Thanks in anticipation.

WARO Email Address

Any information you have which you want to appear in *Break-In*, please send it to <waro@nzart.org.nz>; then it will get to the correct people. All articles will be greatly received. Thanks.

WARO Award Winners

At the AGM Lynnette ZL1LL was presented with the NZ WARO Achievement Award "*Myrtle Earland Memorial Rose bowl*" for her significant contribution to Amateur Radio. Lynnette has served as WARO President, Secretary, Awards Manager, *Break-In* columnist and Net Controller, and of course all her other unseen work involving WARO. Congatulations Lynnette.

Topsy ZL2LS was awarded first place in the Thelma Souper Memorial Cup , and Sharon ZL2BQ was awarded a certificate for taking second place in the contest which was held over the weekend of 2-3 of April

Continuous Membership Awards

30 year Certificates:
Eileen Bain ZL1BRX No 31
Alison Rowe Zl1TXQ No 32
Anne McMaster ZL3VR No 33
Marilyn Thorp ZL2BOA No 34
Jasmine Marshall G4KFP No.35
Jeanne Gilchrist ZL4JG No.36

40 Year Certificate:
Sabina Owen ZL2AZY No. 11
Congratulations, everyone.

Elected Officers 2011 / 2012

President: Margaret Bretherton ZL1MB <tedmarg@clear.net.nz>
Vice President: Cathy Purdy <purds@inspire.net.nz>
Secretary: Lynnette McDonald ZL1LL <lynnette.mcdonald@xtra.co.nz>
Treasurer: Janet Musto ZL1JAN <janetmusto@xtra.co.nz>
Committee: Ngaire Jury ZL2UJT <ngairej@slingshot.co.nz>
Marlene ZL1MYL <perma@xtra.co.nz>
Bev Gillman ZL3OV <bgillman@kinect.co.nz>

Appointed Officers

Awards Manager:
Lynette McDonald ZL1LL
Contest Manager:
Bev Gillman ZL1OS
Sponsorship Secretary:
Ceila Reed ZL1ALK
Librarian / Archivist:
Joline Beale ZL1UJB
Break-In *Columnists:*
Ngaire Jury ZL2ZUJT,
Topsy Scott ZL2LS,
Sharon Miller ZL2BQ
Bulletin Editor:
Bev Gillman ZL1OS
Official Broadcast Co-Ordinator:
Rosemary Boshier ZL1RO

WARO AGM: back row l>r: Sharon ZL2BQ, Lynn ZL2LKW, Cathy ZL2ADK, Ngaire ZL2UJT, Marlene ZL1MYL, Maxine ZL1FW, Topsy ZL2LS. Front Row: Ann ZL3TNT, Margaret ZL1BM & Lynnette ZL1LL.

Margaret ZL1BM presenting Topsy ZL2LS with the first prize in the Thelma Souper.

Margaret ZL1BM presenting Lynnette ZL1LL with a certificate for the New Zealand WARO Achievement Award "Myrtle Earland Memorial Rosebowl".

WARO Contest Manager's Report 2011

The Thelma Souper Memorial Contest held on 2-3 April was very disappointing as far as the very few NZ YLs and especially ZL OM's taking part this year. I thoroughly enjoyed catching up with everyone during the contest; it certainly is a lot of fun especially when using the two call-signs ZL1OS and ZL6YL.

Now to the important part of this report, the place getters are as follows:

YLS

- Topsy Scott ZL2LS 1st YL 5592 points.
- Sharon Miller ZL2BQ 2nd YL 5544 points
- Catherine Hammond VK4GH 3rd YL and 1st DX YL 4980 points.

OMs

- Bill Cousins ZL2AYZ 1st OM 4908 points.

Log Sheets were received from the following YLs:

continued on page 42

continued from page 41

Topsy ZL2LS 5592 points, Sharon ZL2BQ 5544 points, Catherine VK4GH 4980 points, Celia ZL1ALK 4788 points, Ngaire ZL2UJT 3852 points, Lynnette ZL1LL 3504, Bev ZL3OV 3336 points, Sue ZL3AHT 1770 points, Elva ZL1BIZ 1128points, Biny ZL2AZY 560 points. Check Logs were received Bev ZL1OS and of course ZL6YL.

Log Sheets were received from the following OMs: Bill ZL2AYZ 1st OM 4908 points,

Thank you all for making the Thelma Souper Memorial Contest a lot of fun. I do think that the future of the Thelma Souper Memorial Contest needs to be considered very carefully; especially as there does not seem to be the support from our ZL WARO members. I have held the position of Contest Manager for a number of years now. If there is anyone else who would like this position, please put your name forward, otherwise I am willing to carry on with it for one more year.

My first conference by Sharon ZL2BQ

I recently attended my very first NZART Conference in Upper Hutt. I arrived in Wellington Airport on Thursday night with Paul ZL2PO (my partner), Topsy ZL2LS and Dave ZL2BCA. Jim Zl2BHF was there to greet us which was lovely. He took us out to Debby ZL2TDM's house for dinner and a chance to meet with the Councillors.

We left later in the evening to go to our accommodation at Silverstream Resort. We had a nice motel there which was good as the Conference was also held there.

On Friday we (Paul, Dave and I) went to pick up Stu ZL2TW from the airport as Topsy had a Council meeting to attend. Later I met up with Topsy to do a bit of retail therapy before being taken on a wee tiki-tour to see a bit of the Hutt. That evening we returned to Cossie Club for dinner along with all the Councillors. We were made very welcome which was lovely.

Saturday was AGM day so I, along with Topsy, sat in back row to watch what it was all about. It was great to get an insight into what we were in for as Nelson Branch 26 is holding Conference in 2012. Hope you can all come along; I am looking forward to it. Topsy received a Jumbo Godfrey Award for which our Branch had nominated her. She was very surprised as we had managed to keep it secret from her which is no easy feat as she has her finger on the pulse all the time. Branch 26 is very lucky and proud to have her in their club.

Later on we went back to our unit to relax before the evening dinner which was very good. The entertainment was Ian Johnson who was a very good speaker followed by a rock and roll band. A few got up to jiggle around on the dance floor. It was a good evening with great company.

On Sunday, Topsy and I went to the WARO AGM and were very surprised to be presented with first and second in the Thelma Souper Memorial Contest. This was the first time either of us has ever entered into a radio contest. We also had three more members from Nelson who wanted to join WARO; they are Althea ZL2KAT, Judy ZL2OBE and Heather ZL2TYF. That makes it a total of six from Nelson Branch 26 who are now WARO.

It was really cool to finally meet many of the ladies whom I talk to on the HF net 3.695 each Monday night 8pm. They are a great bunch and very welcoming. Hopefully as many as possible can make it Nelson next year. It will be great to catch up and have a chin wag again in person.

After that Topsy and I went to do some retail therapy at Westfield Mall and then we went to Tawa to have a look around Dressmart. We had a lot of fun finding our way there as our TomTom® kept leading us up the garden path, but after we threatened her, she sorted herself out.

We came back later and had a few nibbles in our unit before our evening meal which was again very nice. The entertainment was really good.

I had an awesome weekend with a lot of lovely people and I am really looking forward to our Conference here next year. Hope to see you all here.

Sharon ZL2BQ

Around the Branches

Branch 61. Central Otago

Congratulations to Paul McCauley for passing the Ham Radio exam on 12 April 2001. Paul sat the exam in Alexandra and correctly answered 56 of the 60 questions. Look out for Paul with his new call-sign ZL4SAR. The picture shows Paul, on the left, receiving the Branch's FT707 from our President John Lochhead ZL4QS.

Brian Skeet ZL4PN Sec, Branch 61

NZART Conference 2012 Branch 26

In fantastic Nelson

Queens Birthday weekend 1st – 4th June 2012

Venue: Tahuna Beach Conference Centre, Nelson – Tahuna Beach Holiday Park

Accommodation: (On site) motels, tourist flats, studio unit, cabins and power sites for motor homes. There are also many motels within walking distance to the venue. The well organised would start making plans now. We will not be making accommodation bookings for you, you will be required to do your own, (except for Council), so book now to secure a motel etc.

Forums: If you or someone you know has something they would like to share, either a forum or a talk, please contact us. We would like to hear from you all. Remember this is your conference we are just hosting it for you, so if you want to take part please let us know.

Please contact committee if further information is required:
Chairman: ZL2STR Stewart Robinson: <strob@xnet.co.nz>
Secretary: ZL2LS Topsy Scott: <scott@tasman.net>
Postal Address: Branch 26 NZART Conference 2012, PO Box 1820, Nelson 7040

We are looking forward to seeing you all in 2012 here in sunny Nelson.

WARO 50th Anniversary

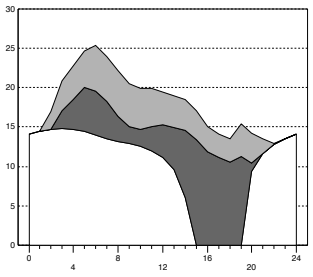
Luncheon to be held on 10 March 2012 at the Millenium Hotel in Rotorua. Other activities planned for the weekend. We are hoping to have some of our Australian friends joining us so should be a great weekend, will keep you all advised. Joline ZL1UJB <jolinebeale@paradise.net.nz> is preparing a booklet for the 50th anniversary and is asking all members to send her their profile asap.

33,

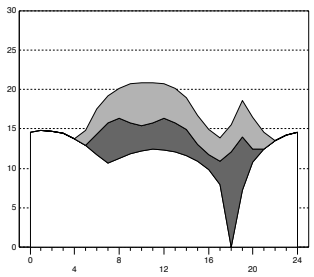
Ngaire ZL2UJT
Topsy ZL2LS
Sharon ZL2BQ

Ionospheric Predictions

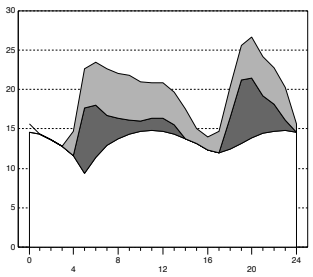
SEPTEMBER / OCTOBER 2011 T-index = 67



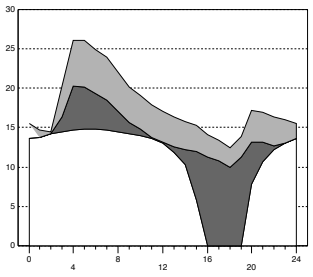
WN-
Moscow
(SP)
16548 km
312°



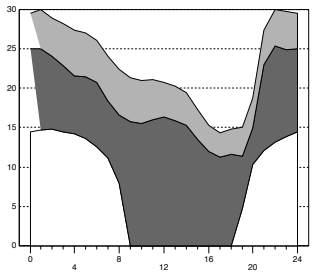
WN-
London
(SP)
18814 km
343°



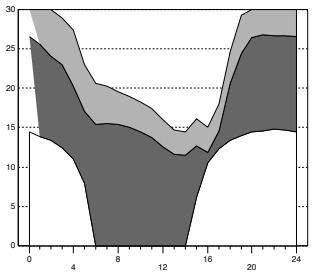
WN-
Jo'burg
(LP)
28265 km
31°



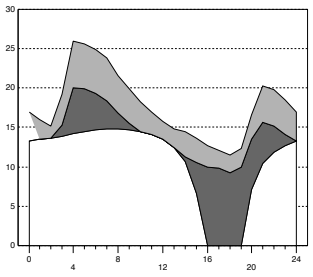
WN-
Istanbul
(SP)
17168 km
281°



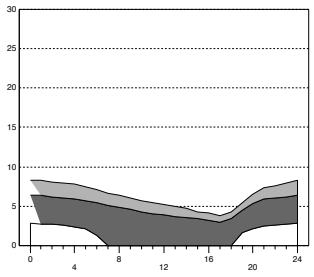
WN-
Tokyo
9274 km
332°



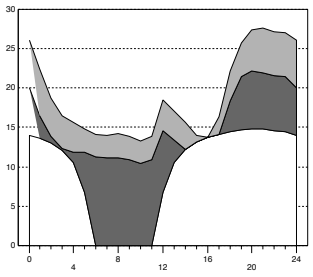
WN-
San
Francisco
10859 km
45°



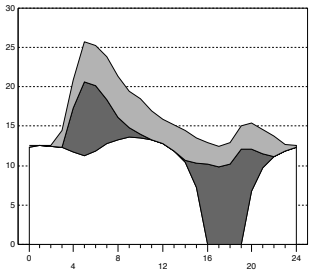
WN-
Cairo
16519 km
261°



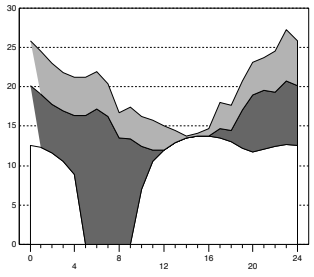
WN-
New
Zealand
300 km



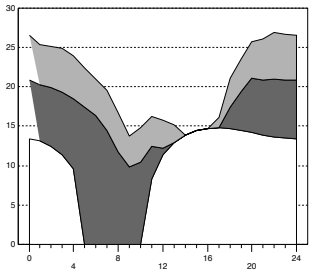
WN-
New
York
14402 km
66°



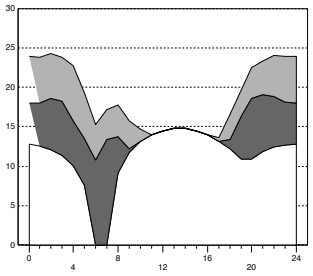
WN-
Jo'burg
(SP)
11759 km
211°



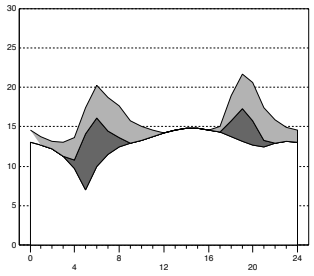
WN-
Rio de
Janeiro
11780 km
144°



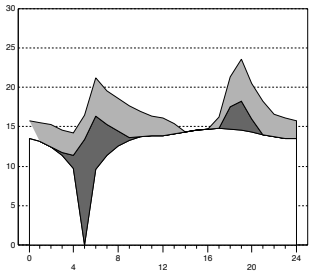
WN-
Barbados
13962 km
104°



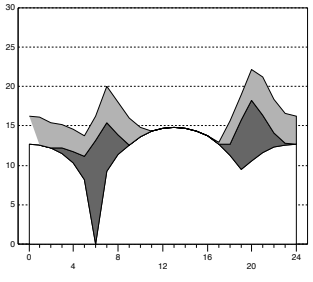
WN-
Dakar
16862 km
155°



WN-
Moscow
(LP)
23476 km
132°



WN-
Istanbul
(LP)
22856 km
101°



WN-
London
(LP)
21210 km
163°

Horizontal axis shows time in UTC.

Vertical axis shows frequency.

Propagation is possible in the shaded areas, with best operation in the darker area.

These predictions are based on solar activity data supplied by IPS Radio and Space Services.

See pages 6–9, Break-In May/June 2004 "Choosing the Best Frequency" by the late John Gabites ZL2AQ for interpretation of forecasts and explanation of terms MUF, OWF and ALF.

HAMADS

WANTED – Sony Model ICF-6800W Communications Receiver in good working order and condition. The 6800W is a 1960's model and has orange model printing on the front panel. Please contact Des Davey, 16 View Road, Te Kuiti 3910 or Ph (07) 878-7315.

WANTED – RADIO VALVES. Cash paid for old radio and TV valves. Prefer new in boxes. Ph (09) 575-6940 or E-mail <paul.ssegrub01@gmail.com>.

WANTED – FT-790RII complete or just the 25w linear amplifier (FL-7025) for the above. Kevin ZL3DAC. Ph (03) 789-9875.

WANTED – Yaesu older 4-pin style microphone for FT-101ZD. Any model considered. ZL3TR. Ph (03) 388-7170 or *Call Book* Address.

WANTED – Drake MS-4 Speaker Cabinet. Condition not important. ZL2AAQ. E-mail <jeffers.rj@xtra.co.nz> or *Call Book* Address.

FOR SALE – HF Transceiver, Kenwood TS-440SAT–$900. I.E.L. 13.8V/20A Power Supply–$150. MFJ Vertical Antenna 40, 20, 15, 10 metres–$200. ZL1TCU. Ph (09) 427-6416 or E-mail <mike_jill@xtra.co.nz> for photos and details.

FOR SALE – Kenwood TS-530S, 1.8-30 MHz 100 W Transceiver incls: 2 spare pairs of finals (6146's) (new), drivers (12BY7's), Instruction Manual, Service Manual. H-B Linear amplifier, 3-30 MHz, 2 x 813 grounded grid (300+Watts), incl: 2 spare 813's (new), separate 2.5kV PSU (22 kg). MED approved. Also Myford Super-7B Lathe, 19" c/c, quick change gearbox, Imperial & metric changewheels, incls: steel stand and wide range of accessories. Details from sole owner ZL3QQ. Ph (03) 358-7844 or E-mail <teejay.s@clear.net.nz>.

FOR SALE – SOCOMEC uninterruptible power supply. Large professional quality unit with control software and leads in new condition – $115. Collect from South Auckland area. ZL4AX. Ph (021) 158-2521 or E-mail <zl4ax@yahoo.co.nz>.

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PO Box 606, Hamilton.
E-mail: harcmday@nzart.org.nz
Web www.zl1ux.tripod.com/market_day.html

Hamads and Classified Advertising in *Break-In*

Hamads up to 30 words are now free as a service to members but the following conditions will apply:

(1) Hamads. A single, free Hamad in each issue of *Break-In* is only available to financial members and Branches of NZART buying or selling personal equipment. Members and Branches wishing to use this service must include their NZART Membership Number or other evidence of membership. If possible they should use the official HAMAD form (on the reverse of their address sheet). If this is not convenient the advert may be emailed or sent typed double-spaced, but proof of current membership must be provided.

Each free Hamad is limited to 30 words; any extra words will be charged at the current rate of 25c per word, telephone and fax numbers count as two words each, e-mail addresses and *Call Book* address as three words each. All prices include GST. Free Hamads will also be accepted for sales of deceased estates where the member was a financial member of NZART during the past 12 months and from branches who are financial members of NZART (ie have a Membership No).

Advertisements are accepted in good faith from amateurs and may only be used be the sale of used radio and allied equipment. The Association, or its representatives, can take no responsibility for them nor take part in any discussion resulting from sales or purchases; remember "Caveat emptor". In case of dispute, the Editor's decision is final.

Trade or business adverts, even from members, will not be accepted here, since this is a subsidised service to members.

(2) Classified Advertisements are available to members, non-members and commercial firms offering products or services for sale, etc. All adverts not meeting the Hamad criteria will be considered to be Classified Advertisements.

Classified Advertisements will be charged at 40c per word. Bold type is available at 50c per word. For semi-display (ie rule above and below) add $5.00. All Classified Advertisements must be pre-paid, receipts will not be given. All prices include GST.

(3) Display style adverts will be still be charged for at the current rates.

(4) Closing date. Please send Hamads and Classified Advertisements to The Advertising Manager, PO Box 1733, Christchurch, to be received no later than the 10th of the month prior to publication. Please make cheques payable to NZART; no cash or credit cards. The Editor and NZART Inc reserve the right to discontinue or decline any advertisement.

For further information and commercial advertising rates, please contact:
Lorne Douglas ZL2AHB, Advertising Manager, c/- PO Box 1733, Christchurch. Telephone (03) 358-9100. E-mail: <hamads@nzart.org.nz>.

EastFest 2011

10-11 September 2011

Saturday 10 September 1000 – 1700 hr and
Sunday 11 September 0900 – 1200 hr

Venue: Ashburton Senior Centre, 206 Cameron Street, Ashburton

Following on from the hugely successful WestFest, held in Murchison last year, we have decided to hold a similar event in Canterbury this year. The format will be similar to WestFest, eg many talks and demonstrations of "hands on" ham radio.

Sunday afternoon will be a visit to the expanded Aviation Museum at Ashburton Airport; hosted by Les ZL3UX.

We will provide morning and afternoon refreshments but not lunch or evening meals.

Further details will follow closer to the event.

No registrations; just let either Jim Nelson <jim.nelson@xtra.co.nz> or Tony Buckland <buckland@scorch.co.nz> know your coming so that we have an idea of numbers.

Cost for the weekend will be $10.

Local Accommodation Find Us. <http://219.89.67.198:8085/Eastfest.htm>

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